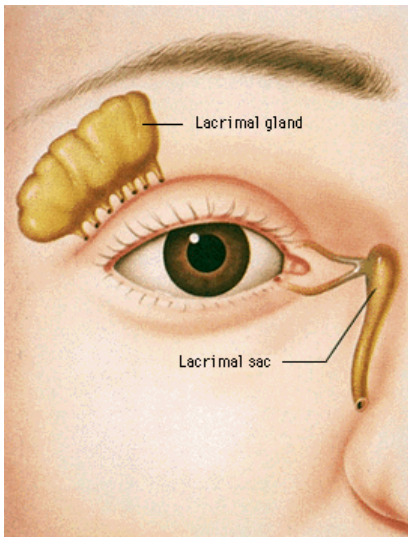


# Dry Eyes

## Management Strategies



- **Overview**
- **How our eyes keep themselves moist**
- **Dry Eyes: What causes them?**
- **How can you manage dry eyes?**



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# Dry Eyes: An Overview

Just about everybody suffers from dry eyes at some point in their lives. For many, it's not a big deal. For others, it can make life utterly miserable. Most people's experience is somewhere in between these two extremes.

## What is it?

“Dry eyes” is an all-encompassing term used to describe eyes whose moisture system is failing. The condition may be subtle or extreme.

## Shouldn't I just use eye drops?

Although lubricating eye drops have been the standard therapy for dry eyes for a long time, there are many strategies that are more appropriate. Eye drops are better than nothing, but frequently the relief is temporary, leaving many dry eye patients frustrated at having to use them so often.

## What's the cure?

Because our eyes' moisture system is complex, and frequently prone to attack from various sources, it's more appropriate to refer to “management strategies” for dry eyes, rather than a “cure”. The goal of dry eye therapy is to get the problem under control as quickly as possible, then to work out a system of minimal intervention while allowing you to enjoy moist, comfortable eyes.

In the early stages, reversing the processes that led to your dry eyes can take some time commitment—usually around 5 minutes per day. That doesn't sound like much, but it's a lot of time for a busy person. Ideally, this commitment is short-lived, allowing you to keep your eyes comfortable with hardly any effort in the long run.

## Should I be worried?

No. For the vast majority of people with dry eyes, the condition is not a threat to their sight in the long term. Although (usually temporary) vision problems can result, most of the problem lies in the *discomfort* brought about by dry eyes.

## What are the symptoms?

The symptoms of dry eyes may surprise you. There can be all sorts of flow-on effects, including allergies, referred pain and even vision problems. These are some of the symptoms that dry eye patients experience:

- Itching
- Burning / stinging
- Redness
- Watering
- Tired feeling
- Increased eye “awareness”
- Headaches
- Ear pain
- “Sleepy dust”
- Light sensitivity
- Stabbing pains
- Intermittent blurred /filmy vision

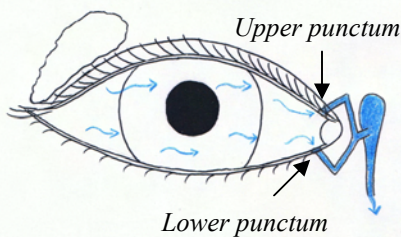
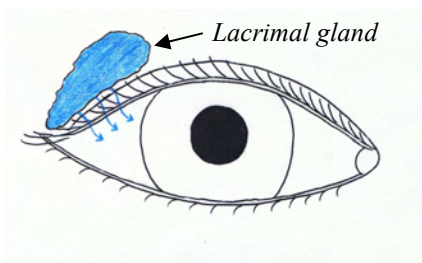
# How Our Eyes Keep Themselves Moist

To best understand the causes—and management strategies—for dry eyes, it's useful to understand *how* our eyes keep themselves lubricated.



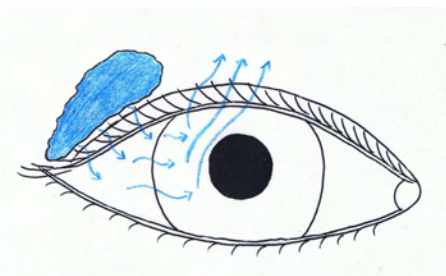
Many people are surprised to learn that our eyes have tears on their surfaces *all* the time, not just when we're upset. This very thin layer of fluid is necessary for our eyes' nutrition, comfort, and even vision. Tears also serve a crucial role in flushing away everyday debris, such as dust, pollens, bacteria and makeup.

*Normal* tears (there are abnormal tears—more about this later) are produced in the *lacrimal gland*. Each one of our blinks sets off a pumping action from the lacrimal gland, and tears are squirted onto the surface of the eye.

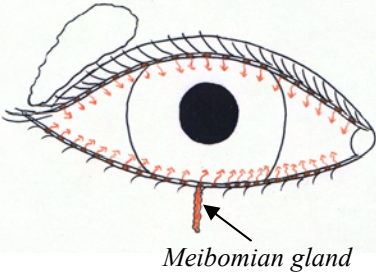


Each blink then moves the tears towards the nose, where they drain into two holes, called the *puncta*. Most people have seen their lower punctum, and there is a common misconception that this is where tears come from. In fact, quite the opposite is true—this is where tears *go*. The upper punctum is usually tucked out of sight. Our tears carry debris from our eyes into the puncta, where they drain into the nose and evaporate. This is why we get runny noses when we cry.

Tears are usually very thin (about 40 microns thick) and eyes are warm. Unless we give them a reason not to, tears would evaporate from our eyes very quickly, before they've had a chance to flush anything away or moisturize the surface. We may as well not be producing any tears at all if we can't keep them on our eyes for a while.



# How Our Eyes Keep Themselves Moist Continued...

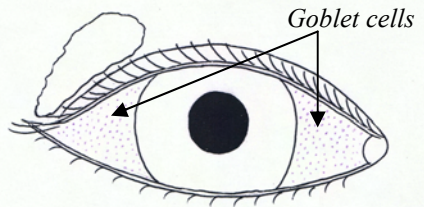


Fortunately, nature has provided us with oil glands, called *Meibomian glands*. Water won't evaporate through oil, and the oil that squirts out of the Meibomian glands (again, pumped with each blink) provides an anti-evaporative shield, allowing the tears to remain on the eye until they are flushed away into the nose.

We have about 25 Meibomian gland openings on each lower lid, and about 20 on each upper lid. The gland openings are placed just behind the roots of the eyelashes, on the "windowsill" of the eye.

*The drawing illustrates the openings of the Meibomian glands, and in the one full gland shown, how deeply these glands delve into the skin of our eyelids.*

We also have *goblet cells*, which are tiny glands dotted around on the conjunctiva (the filmy lining on the whites of our eyes). Goblet cells are important because they make a thin layer of *mucus*, which allows tears to spread evenly across the surface of the eye. In a way, the sticky mucus helps to keep the tears on the eye's surface from the *inside*, whereas the Meibomian oils block them in from the *outside*.



*There are many thousands of goblet cells on each eye—the drawing is simply to illustrate where they are found.*

Overall, we have very clever and complex systems to allow eyes to stay moist, clean and comfortable. Because there are many different parts of the lacrimal (moisture) system, there are many ways that things can go wrong. Some are far more common than others.

# Dry Eyes: What causes them?

So how do things go wrong? Take your pick:

- the lacrimal gland could slow down tear production,
- the oil glands could stop working well, or
- the goblet cells could become damaged.

In my practice in suburban Brisbane, most of the successful therapies aimed at managing dry eyes involve the improvement of the Meibomian glands' function. Over many years I've become more and more convinced that the majority of dry eye problems are caused by malfunctioning Meibomian glands.

Certainly there are conditions which will cause the lacrimal gland or the goblet cells to malfunction. Most people, however, will have some degree of Meibomian dysfunction, and in most cases, addressing this *first* is a big step forward in allowing the eyes to be comfortable again.



*Staphylococcus aureus*

Because we're warm, bacteria love to live on our skin. The most common type of skin bacteria is *Staphylococcus aureus*.

Eyes are warm too. And wet. And they have lots of little crevices for bacteria to become *very* cosy. Eyes are a resort facility for *Staphylococcus*, and they *love* living in the Meibomian glands.

When bacteria reach massive population levels in a Meibomian gland, the result is a Meibomian gland infection, called a *stye*. This is a tender lump, like a pimple, on the eyelid.

When the population levels are just "too high for comfort," rather than "infective," the result is more subtle, but more chronic: dry eyes.



*Hint: If you ever develop a stye, your best weapon is heat. See the later section on safe application of hot packs. Often antibacterial ointments are necessary too, but early intervention with heat is your best bet.*

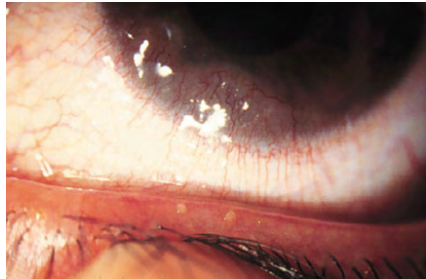
# Dry Eyes: What causes them?

When *Staphylococcus* bacteria make themselves cosy in our Meibomian glands, one of the things they do is to release toxins and enzymes. These do 2 things which interfere with the quality of our oils:

- The enzymes break the oils down into free fatty acids. These are irritating in themselves, and do not provide the anti-evaporative seal normally afforded by good quality oils.
- The oils near the Meibomian gland openings also become solidified, or at least “gluggy”. This makes it harder for the liquid oils to find their way to the surface.



*An extreme case of Meibomian Gland Dysfunction*



*Solidified oils being massaged from the lower lid's glands*

It's fair to say that because it's normal for bacteria to live around our eyes, most people have at least some degree of Meibomian gland dysfunction (MGD). For some, their MGD is subclinical - they have no symptoms. For others, their symptoms can be minimal, moderate or extreme.

The cornerstone of dry eye therapy at ICU Optometrist is aimed at cleaning out the Meibomian glands and making the area less of a haven for *Staphylococcus* bacteria.

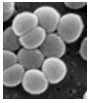


So how is this done? This is where optometry borrows its ideas from good dental care.

We all know that if we don't keep our teeth clean, the germs in our mouths will cause all sorts of problems, because there's plenty of food there to keep them alive.

When we also apply simple good hygiene to our eyelids, it's not surprising to find that they become much more comfortable.

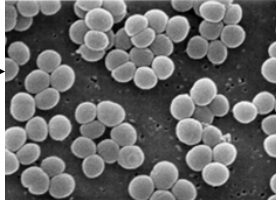
# How can you fix dry eyes?



+

Dead skin  
& other  
debris

→



The food supply for bacteria that live around our eyes consists of normal *stuff* that collects there. This includes flakes of dead skin, bits of mucus collecting around the edges of the lids, all sorts of junk that's just *there*.

Keeping the eyelids free of this debris is crucial to maintaining a healthy lacrimal system. Keeping the food supply for bacteria down to minimum helps to keep bacterial numbers under control.

When the glands have *already* been acted upon by the bacteria, it's also useful to get a little heavy-handed with the hygiene for a short while.

**Hot pack therapy** is a simple, 4-step procedure which allows you to reverse the effects of skin bacteria on Meibomian glands. Put simply:

1. Application of heat melts the solidified oils



2. The melted oils are massaged out of the glands



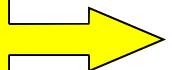
3. The waxy oils are dissolved with Blink-N-Clean® eye drops



4. Lid Care is used to mop up the debris, while at the same time removing the food supply for the bacteria.



See the next page for more details on how to apply hot pack therapy.



# Hot Pack Therapy

1. Heat a blue gel pack until it's just slightly too warm for comfortable, prolonged fingertip contact. If you're using an 800W microwave, a 25cm x 11cm gel pack should take roughly 2½ minutes on a medium setting (50%). Be careful, as power varies between microwaves, and some of our patients have exploded their hot packs.

Wrap the gel pack in a clean paper towel. This diffuses the high heat, so that it can be delivered safely. Test it on the inside of your forearm first to ensure it's not too hot. Then hold it against your closed eyes for 2 minutes.

2. Remove the hot pack and massage your lids. This is done by placing your fingertips immediately below the lash line on the lower lids, and pressing firmly enough to double your vision. You can do both eyes at the same time by using both hands.

Spend about 30 seconds on the lower lids, pressing firmly at each of about 6 or 7 locations for about 2—3 seconds each. Then close your eyes, look up and repeat the massage step for the upper lids.

Once you've finished, you can assume that any waxy plugs will have spilled their melted contents onto your tear film. In the short term, this means you'll have oily, waxy junk in your eyes, which makes it hard to see.

3. A drop of Blink-N-Clean® is very useful at this point, as it dissolves the waxy, oily debris. Vision should be much better immediately.

4. Finally, a quick wipe-over with Lid Care® will clean up any remaining debris, and make it harder for the bacteria to continue to thrive. Lid Care® comes with its own set of instructions, which we will happily provide for you.

*The gel packs, Lid Care® and Blink-N-Clean® drops are available here at ICU.*

## How often should it be done?

Hot pack therapy should be performed once daily for 2 weeks. At this point we normally recommend to either taper the frequency of the treatment, or to stop altogether.

## Which time of day is best?

Early in the day is best, as there will be some degree of re-solidification of the oil glands at some point. If hot pack therapy is applied in the morning, you'll enjoy more of the benefits while you're *awake*.

Having said that, applying hot pack therapy at night is far better than not doing it at all.

# Is that all there is to it?

No. Hot pack therapy is a fantastic way to start, because most people have some degree of Meibomian Gland Dysfunction (MGD).

However:

- One application is usually not enough
- Sometimes other strategies are needed as well as hot pack therapy
- Although it is usually extremely helpful, occasionally hot pack therapy *doesn't* help, and
- Although MGD is an extremely common reason for eyes to become dry, sometimes the main reason for the dry eyes is *not* MGD.

I usually recommend a 2-week course of daily hot pack therapy, which requires a commitment of about 5 minutes per day. If this seems like too much to ask of your time, perhaps your symptoms aren't bothering you much. There *are* other, less time-consuming strategies which work well for people with minimal, or infrequent, symptoms of dry eyes. These are referred to later in the booklet.

After 2 weeks, I like to review your eye health and symptoms, and determine:

1. Whether the treatment has been partially or completely successful,
2. Whether we need to approach things from a different angle, or
3. Whether we can now make things easier for you to keep things comfortable—easy maintenance therapy to keep your eyes in a “holding pattern” of healthy lubrication.

Ideally, the holding pattern should be quick and easy. Frequently the best strategy for long-term comfort of your eyes is daily lid hygiene—the “Lid Care” step of the Hot Pack Therapy. This takes 10 seconds per day and, for ladies, doubles nicely as an extremely effective eye makeup remover.

When the hot pack therapy has been partially successful (for example, your symptoms are better but your eyes still show signs of inflammation), often at the 2-week mark I like to recommend that it be tapered rather than ceased altogether.

For many patients, symptoms at their 2-week review visit will be “better....but not 100% better”.

This is when we consider these avenues:

- Continued hot pack therapy, or
- Approaching dry eyes from different angles. These are listed on the following pages.

# What are the alternatives?

Most therapies for dry eyes are catered specifically for the appearance of various features of your eyes, either at the initial or review appointment. Different features often indicate different approaches.

These are some of the approaches we recommend:

## Anti-Allergy Drops

Dry eyes and allergies are often seen together, because *each* can cause the other to occur. Often allergy



symptoms will disappear when dry eyes are treated, simply because the eyes can now do a better job of flushing away the offending allergen—be it dust, pollen, cat dander, whatever. Sometimes however, this is not enough and specific anti-allergy therapies are recommended. Usually this takes the form of Patanol® or Zaditen® drops, applied twice daily for at least a month. The drops are immediately soothing and usually do a great job.



After a month, I usually recommend trying to go without them to see whether symptoms stay under control without them—I like the KISS principle—“keep it simple, stupid!” The fewer things you have to do, the better.

## Medicated Drops

Anti-inflammatory drops are also very useful. These are *steroids*, and must be used judiciously.

In the *long* term (generally many months), strong steroids can cause undesirable side-effects. These include cataracts, glaucoma, and increased risk of infection. The steroids I like to prescribe are very mild; nevertheless, I like to get in, and get out, within a short matter of weeks.



## Medicated Ointments

Ointments allow a longer contact time with the parts of the eye that require medication.

Typically, when ointments are indicated, the ones I prescribe are antibiotics, steroids (see notes above) or both. The antibiotics kill the bacteria living on the lids (a step up from simply removing their food supply with lid hygiene) and the steroids settle the swelling, redness and irritation often seen in dry eyes.



## Baby Shampoo Lid Scrubs

Baby shampoo is a viable alternative to using Lid Care®. Ladies often prefer the

Lid Care® because it doubles as an eye makeup remover at the end of the day. For gents, baby shampoo can be preferable because it can be kept in the shower and is quick and easy to use. We recommend Johnson's Junior Easy Rinsing Foam Shampoo—the pump pack (and the fact that it foams) makes it very convenient.



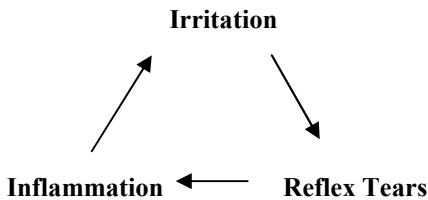
# What are the alternatives?

## Continued...

### Punctal Plugs

I love punctal plugs—they're inexpensive, easy and they often make a huge difference to the stubbornly dry eye.

Dry eyes often get into a cycle whereby they perpetuate themselves. The irritation leads to *reflex tearing*. Reflex tears do *not* come from the lacrimal gland. They come from what are collectively called *accessory* lacrimal glands. Often their volume is excessive, and people end up with watery eyes—quite a paradox when the diagnosis is “dry” eyes.



*The cycle of reflex tearing*

The wateriness of reflex tears is not the only problem. Reflex tears come laced with *cytokines*: chemicals which tell your immune system to step things up a notch. When the immune system goes into hyperdrive, eyes can become red, swollen, and *sore*. The soreness brings on more reflex tears...and the cycle starts again. This is one reason that steroids are useful (see previous page) - steroids give your immune system the message to “back off a little”. Punctal plugs can send the same message.

Finally, reflex tears are *hypotonic*, meaning they are less salty than your eye. A process called *osmosis* then kicks in, whereby your cornea (the clear dome on the front of your eye) will soak up water, in an attempt to provide a better balance in the saltiness of the environment. This causes mild swelling of the cornea, which can lead to a slight decrease in its transparency. In other words, your vision isn't as good. In some people, this swelling can cause changes in the *curvature* of your cornea, which can also temporarily alter your vision.

Punctal plugs are tiny sticks of collagen, which are painlessly inserted into the drainage holes leading to your nose. This forces your tears to recirculate on your eye until they eventually evaporate, giving your ocular surface a bath in its own tears. The extra comfort provided by this then sends a message to the reflex tears: “we don't need you.” The cycle of reflex tears and inflammation is stopped.



Collagen plugs dissolve after 5 days, which is usually all that's required. In about 1% of people, the plugs will cause too much of a “damming” effect, and tears overflow onto the face; this is pretty unpleasant. The surprise here is that this doesn't happen more often, and it's generally a risk that's worth taking, especially when you consider that it would only last for 5 days.

Permanent (silicone) punctal plugs are also available. These are usually reserved for people whose lacrimal gland isn't working very well, including those with Sjogren's Syndrome.

# What are the alternatives?

## Continued...

### Omega 3s

Flaxseed oil and fish oil capsules are readily available in supermarkets and pharmacies. These omega 3 supplements are gaining widespread use in many areas of health, for good reasons. Omega 3s are good for your skin, your joints, your brain, your mood and your blood. They also appear to be good for your eyes. For many (but not all) people, they help to stabilize Meibomian gland function, helping to make eyes more comfortable.

The recommended daily dose is 2000mg (usually 2 capsules), and this may take up to 6 weeks to have an effect on your eyes. There are some suggestions that omega 3s may also help to reduce the risk of macular degeneration—a common and blinding eye disease that affects thousands of older Australians.



Of course you can also increase your intake of omega 3s by eating more fish, such as salmon or tuna. Many processed foods now also contain added omega 3s.

**A word of warning:** the anticoagulant effect of omega 3s is usually a good thing (it helps to reduce the risk of stroke), but you can go too far. If you find yourself bruising easily, your dosage may be too high for you, particularly if you're also taking other anticoagulant medications, such as aspirin.



### Dietary Intervention

Other changes to your diet can also help to minimize or prevent dry eyes. Vitamins A, C and B6, as well as zinc and folate, are involved in various processes that maximize the efficiency of your lacrimal system. You can find these nutrients in various fresh foods, including carrots (yes! Carrots *are* good for your eyes!), citrus fruits, grains, legumes, and green leafy vegetables.

Because a good diet is important to *so many* of our body systems, it's not surprising to know that it's good for your eyes too. If you have trouble getting your 5 veges and 2 fruits every day, consider a multivitamin tablet, which includes zinc and folate, and vitamin C by the gram.

**TIP**

A good exercise program is essential to ensure efficient *delivery* of nutrients to various parts of your body. The eye in particular has a few “hidey holes” which can be bypassed by a sluggish cardiovascular system. Add 30 mins of walking to your daily routine to maximize good health in all sorts of ways.

# What are the alternatives?

## Continued...

### Environmental

Our behaviour at computers is often the triggering factor that leads to eyes becoming chronically dry.

Put simply, we don't blink very often when concentrating on close work. Blinking does so many things to keep our eyes lubricated—it pumps tears and anti-evaporative oils onto the eye, it flushes away debris and it re-wets dry spots that form on the ocular surface.



Here's the Catch-22 though: if you're concentrating on your work, you won't blink often. If you're concentrating on your blinking, your work will suffer. So a good compromise is to take a short break every 15 minutes and "catch up." Blink rapidly for a few seconds, then squeeze the eyelids shut to really pump out some oils. It's also a good opportunity to look at something in the distance for a few seconds (between blinks!), as this can decrease your chances of developing short sight, particularly if you're under 25.



Our tears evaporate faster when we're in air conditioning.

However, air conditioning is a way of life in Queensland, so we need to find ways to work around it.

One simple way is to stay out of the *direct* stream from air conditioning vents, including those in your car.

Another is, where possible, turn the air conditioning down, or flick it off, when you don't *really* need it.



# What are the alternatives? Continued...

## Tears Again®

This is quick and easy to use. It's a spray bottle, containing a substance which mimics your eye's natural oils. In other words, it's anti-evaporative.

Tears Again® is simply sprayed onto your gently *closed* eyes (and ladies, it doesn't wreck your makeup). It seeps into the gap between the upper and lower lids and adds to the oil layer.

Although it's always preferable to first address the efficiency of your in-built *natural* oil glands, this is a great pick-me-up when you're busy, or out shopping in air conditioned shopping centres.

Not everybody likes this product—our policy at ICU is that if you purchase this and find you don't like it, return it for a full refund.



## Artificial Tears

I've put this last because that's where it belongs. Artificial tears have been the standard approach to dry eye therapy for many, many years. However, although they're better than nothing, they frequently do little to address the *reason* for the eyes being dry.

Not only that, for many people, artificial tears are often needed on a ridiculously frequent basis. It's no surprise then that these people become frustrated with their dry eye "treatment" and give up altogether.

I like to recommend artificial tears as:

- An adjunctive therapy to help flush away debris and inflammatory chemicals
- An adjunctive therapy if everything else is "not enough,"
- An "as needed" approach to people with infrequent dry eye problems, or
- A last resort.



# Dry Eye Checklist

Which of these symptoms do you notice?

Tick the boxes for the symptoms you have and circle any symptoms that are particularly bothersome

- |   |  |
|---|--|
| <input type="checkbox"/> Itching  | <input type="checkbox"/> Redness                             |
| <input type="checkbox"/> Burning  | <input type="checkbox"/> Watery                              |
| <input type="checkbox"/> Stinging   | <input type="checkbox"/> “Sleepy dust”                       |
| <input type="checkbox"/> Intermittent blur / filminess                                | <input type="checkbox"/> Ear pain                            |
| <input type="checkbox"/> Occasional stabbing pains                                    | <input type="checkbox"/> Light sensitivity                   |
| <input type="checkbox"/> Regular headaches  | <input type="checkbox"/> Pain on opening eyes upon awakening |
| <input type="checkbox"/> Tiredness (more than you should have given your sleep hours) | <input type="checkbox"/> Increased “awareness” of eyes       |

**Overall, how much are your dry eyes bothering you?**

- Not at all—I only mentioned them because I was asked
- They do bother me, but only occasionally
- It’s a reasonably frequent problem
- They drive me nuts.

**Recommended management strategies**

- |   |   |
|---|---|
| <input type="checkbox"/> Hot packs            | <input type="checkbox"/> Exercise programme       |
| <input type="checkbox"/> Punctal plugs        | <input type="checkbox"/> Tears Again®             |
| <input type="checkbox"/> Anti-allergy drops   | <input type="checkbox"/> Lid Care                 |
| <input type="checkbox"/> Medicated drops      | <input type="checkbox"/> Baby shampoo lid scrubs  |
| <input type="checkbox"/> Medicated ointments  | <input type="checkbox"/> Environmental adaptation |
| <input type="checkbox"/> Omega 3 supplements  | <input type="checkbox"/> Artificial Tears         |
| <input type="checkbox"/> Dietary intervention | <input type="checkbox"/> Other .....              |

**If I’ve given you this booklet, you probably have a followup appointment booked so that I can review your progress and discuss long-term strategies. Please read through the notes on the different management strategies so that we can discuss which ones are likely to be effective AND easy to implement for you.**