# Strabismus and amblyopia in children (squint and lazy eye)

Strabismus, often referred to as a squint and sometimes as a ‘turn’ in the eye, is an eye condition where the eyes do not look in the same direction as each other. This means that while one eye looks forwards to focus on an object, the other eye turns either inwards, outwards, upwards, or downwards. This means that the eyes do not work together as a pair all the time.

Most strabismus develops in young children. Strabismus can also develop in adults, but an adult will develop strabismus for different reasons than a child will. This information will focus on childhood strabismus.

Sometimes when a child has strabismus, the sight in the eye which turns may be weaker.

“Lazy eye” is a commonly used term to describe an eye that doesn’t see as well as it’s fellow eye. It is not a medical term and can have different meanings for different people. The term lazy eye usually describes a situation where one eye doesn’t see as well as the other, even when glasses are worn, known as amblyopia. The poorer sight in the “lazy eye” may be caused by a turn in the eye or by a problem with its focusing ability.

For the purpose of this factsheet, we will refer to the medical terms, strabismus for squint and amblyopia for lazy eye.

## How do the eyes work together?

Most people have eyes that work together as a pair. When you look at an object your eyes will be pointing in the same direction and focusing on the same point. Your brain will receive similar - but slightly different - pictures from each eye so it can join them together to allow you to have binocular and three-dimensional (3D) vision. This allows you to have depth perception (also known as stereopsis) which helps you to judge how far away things are. The movement of each eye is controlled by six muscles that move your eyeball in different directions. The muscles for one eye also work and coordinate with the muscles from your other eye so that they can work together.

## How does vision develop?

When you are born, your eyes and brain have to learn to work together. As you grow, you use your eyes to collect information which is sent to the brain to process, and this builds up a connection between the eyes and the brain. This connection between the eyes and the brain is known as the visual pathway.

The visual pathway develops throughout your childhood and up to the age of about eight years old. During this time, it’s important that your eyes send clear and similar images to your brain. The eyes and brain use your visual experiences to improve their coordination and allow your visual pathway to develop as fully as possible. This allows a good level of vision to develop in each eye separately as well as allowing the two eyes to work together as a pair to allow you to see in 3D.

After the age of about eight years old, the visual pathways and the 'seeing' parts of the brain are nearly fully formed and are difficult to change. Therefore, it’s important to treat childhood vision problems before this age.

## What is childhood strabismus?

Strabismus is common and affects around three per hundred children in the UK (not far off an average of one child in every class of 30 children).

Strabismus is where one of your eyes points in a different direction from the other eye. This may be more noticeable when a child focuses on a small object, is tired or feeling unwell, although in some children the strabismus is noticeable when they are **NOT** focusing directly on something.

## Timing of strabismus

When your child is born their eyes and brain do not work well together. Over the first few months you may notice your baby’s eyes appear to squint or move separately from each other every now and again. This is normal and usually gets better by around two months and should be gone by the time they reach four months. If this isn't the case, you should speak to your GP or health visitor about a referral for a full assessment with your hospital eye department.

More commonly, strabismus will develop a little later in your child's life, often between the ages of 18 months and four years old. If you notice that your child appears to have strabismus, it’s important to have this checked by an optometrist (also known as an optician) as soon as possible. Children are entitled to a free NHS eye test. Your optometrist may be able to correct the strabismus (for example with glasses). If your optometrist cannot correct it, they will then be able to refer your child to the hospital eye clinic to be seen by an orthoptist (a professional who investigates and manages squints).

## How is strabismus described?

Your child’s strabismus may be described in different ways by the professionals looking after your child’s eyes. Some of the words you may hear will have particular meanings when used to describe the strabismus. The strabismus may be described as **refractive** if it is caused by a focusing problem and **non-refractive** if it isn't.

* Which eye appears to be affected – either **left** or **right**, or **alternating**, where the strabismus can alternate from one eye to the other.
* Which way the eye turns – if the turn is inwards, it is called a **convergent** strabismus or **esotropia**, if the turn is outwards, it is called a **divergent** strabismus or **exotropia**, if the turn is upwards, it is called a **hypertropia**, if the turn is downwards, it is called a **hypotropia**.
* When it can be seen - if it is visible all the time, it will be referred to as **constant** and **intermittent** if it comes and goes.

This means that your child's strabismus can be carefully categorised by the professionals involved. They may describe your child’s strabismus using a mixture of these words, for example, an “intermittent convergent strabismus”. Knowing the nature of your child's strabismus and labelling it as accurately as possible can help to decide how it can be managed.

## What are some of the different types of strabismus?

Some common types of childhood strabismus include:

#### Congenital or infantile esotropia

This is an inward turning strabismus which normally develops in the first six months of life. There is no known underlying cause.

#### Accommodative esotropia

This type of strabismus is caused by long-sightedness (hypermetropia) which causes an inward turning strabismus. The strabismus can be improved or sometimes eliminated when wearing glasses.

#### Non-accommodative esotropia

This type of inward turning strabismus usually develops in children between two and five years old and is a strabismus which isn’t improved by wearing any glasses.

#### Intermittent distance exotropia

This is an outward turning strabismus which comes and goes, usually being more apparent when a child is looking at things in the distance. Commonly, parents may notice that the eye turns out when the child is tired, daydreaming or in bright sunlight. A child may also close or rub one eye when they are out in bright sunlight.

## What are the risk factors for strabismus?

There are some risk factors that can increase the chances of a child developing strabismus:

#### Family history

Some types of strabismus can run in families, so if a parent has had strabismus or needed glasses from an early age, there may be an increased chance that their child may also be affected. The way that strabismus may be inherited is not yet fully understood.

#### Prematurity or low birth weight

Children that are born early (before 32 weeks) may be at more risk of developing strabismus. Babies with low birth weights are also more at risk of developing strabismus.

### Other conditions

Children with conditions such as cerebral palsy and Down syndrome may also be more prone to develop strabismus.

There are many different types of strabismus. For some children there will not be a particular cause for their strabismus. Some common causes of strabismus can include:

#### Focusing problems (refractive errors)

Problems with the focusing power of the eye are very common, this is known as having a refractive error. They are usually corrected by glasses. The refractive error most likely to cause strabismus is long-sightedness (hypermetropia), where your eye focuses better in the distance than when looking close-up, causing the eye to work harder to see near things clearly.

Children's eyes have a lot of focusing power, which allows them to make the things they look at clear in the distance and up close (for near vision). If your child is long-sighted their eyes will need to focus harder to make their vision clearer, particularly for near vision. This focusing is called ‘accommodation’. When we accommodate, our eyes naturally ‘converge’ or point inwards, towards the nose. The more a child needs to accommodate, the more their eyes will also converge.

This means that if a child is long-sighted and needs to accommodate to see better, this can cause their eyes to develop an inward turn known as accommodative esotropia. Having glasses to correct their long- sightedness allows their focusing to relax and give clearer vision. The glasses may also straighten their eyes and remove the strabismus because their over convergence will be relaxed too. As the strabismus is caused by long-sightedness, it will only be straightened when the long-sightedness is corrected. So, it is important that the child wears glasses and has a spare pair in case of breakage.

#### Eye conditions

Less commonly, strabismus or amblyopia may develop due to other eye conditions. Conditions such as congenital [cataract](http://www.rnib.org.uk/eye-health-eye-conditions-z-eye-conditions/cataracts) or retinal or optic nerve conditions can cause an eye to have poor vision resulting in strabismus or amblyopia.

#### Eye muscle problems

Some strabismus only occurs when the eyes are looking in certain directions. These are usually caused by a specific muscle weakness resulting in an eye movement problem. This doesn’t affect vision in the same way as other strabismus because the eyes are usually straight most of the time.

Brown’s syndrome and Duane's retraction syndrome are examples of eye conditions which can cause a strabismus only when looking in certain directions.

Brown’s syndrome is where an eye has difficulty moving upwards. It’s caused by one of the eye muscles that pulls the eye upwards not being able to move freely.

Duane’s retraction syndrome is where one or sometimes both eyes do not turn to the side very well and the eyelids may open and close as the eyes try to turn. It’s caused by a mis-wiring of the nerves which control certain eye muscles.

These types of strabismus may not require any treatment as the eyes are straight most of the time, but they may still be monitored by an ophthalmologist (hospital eye doctor), orthoptist, or optometrist.

It is important to have your child’s eyes examined immediately if you notice any sudden change in the movement or positioning of their eyes.

## What are the treatments for strabismus?

The aims of treatment for a strabismus in childhood are to make sure that the vision in each eye develops normally, thereby preventing the development of amblyopia and to help the two eyes work together so that binocular and 3D vision can develop as well as possible. For treatment to be successful, it needs to be given before the visual pathway finishes developing (ideally before the age of about eight years).

Most treatment for strabismus is on-going and usually involves regular visits and examinations at the hospital eye clinic or with a specialist optometrist for a number of years. How often your child needs to be seen by the eye clinic will depend on factors such as their age, the type of strabismus they have, and how well a treatment is working.

How your child's strabismus is treated will depend on the type of strabismus they have. Often more than one treatment or a combination of treatments may be needed to get the best result for your child's vision.

Some of the most common ways that strabismus can be treated include:

* Glasses
* Occlusion therapy (patching)
* Exercises
* Surgery

#### Glasses

Usually, the first step in dealing with strabismus is for your child to be tested to see if they need glasses. It’s important for your child to have properly prescribed glasses to give them clear vision in both eyes. This can help to prevent the squinting eye from becoming lazy. Most children with a strabismus will be prescribed a pair of glasses that they will need to wear all the time.

You may notice when your child wears their glasses that their strabismus becomes less noticeable or disappears completely. This type of strabismus is known as an **accommodative** strabismus and as mentioned earlier, is caused by long-sightedness. When your child takes their glasses off you will notice that their strabismus can be seen again. This means that the glasses need to be worn to correct the strabismus. Many children may only need to wear glasses to treat their strabismus.

It’s not unusual for your child to say that they can see better without their glasses at first. This is because they have been working their eyes so hard to focus without glasses that they find it difficult for their eye to “relax” into the glasses and let the glasses do the focusing for them. This usually settles once your child is wearing their glasses all the time. You can usually expect a follow up visit with the orthoptist or optometrist between one and four months after your child has been given their first pair of glasses.

#### Helping your child to wear glasses

It can be difficult to get children to wear glasses. If your child isn't keen to wear their glasses, a lot of encouragement will help. Being positive about wearing glasses, making it a part of your child’s everyday routine and praising them when they wear their glasses can also help.

When choosing your child’s glasses, it’s helpful to get advice from a dispensing optician. A dispensing optician can ensure that the glasses fit correctly and are comfortable as this can help your child to wear their glasses. It’s also essential that your child is looking through the centre of the lenses of their glasses and not over the top, so the correct fitting of their glasses is important. Frequent visits to a dispensing optician are necessary for some children.

Most children with strabismus who need glasses need to wear them all the time. This can cause challenges at times, for example when in the playground or when it’s raining. Most of these can be overcome with time and with learning how to care and look after the glasses. Ask your child’s optometrist or dispensing optician for more information about how to deal with situations like these.

#### Occlusion therapy (Patching)

Occlusion therapy can’t straighten the eye but is used to improve the level of vision in an amblyopic eye. Patching involves covering your child's good eye with a patch. Your child then uses their weaker eye to see, and this helps to build up the pathway between this eye and the brain. In effect, the visual development of the weaker eye gets a chance to catch up. If patching is done early enough in childhood, the vision can improve, often up to a normal level.

If your child wears glasses, patching should always take place when glasses are worn, usually with the patch worn underneath their glasses, so that they can’t ‘peep’ around the patch. Your orthoptist or optometrist will let you know how often, for how long and when will be the best time for your child to wear their patch, as this can vary. The patch may be worn for a few hours a day or for most of the day. When your child is wearing their patch, some practitioners recommend encouraging the child to use their amblyopic eye by reading, colouring, watching television or playing computer games. If your child is told they need to wear their patch during school hours, it’s important to explain to your child's teacher how and when the patch should be worn. For some children, the vision will be quite poor when the patch is worn, so the child might need to sit near the front in class.

Most children take well to wearing their patch and some may see it as a fun game. However, some children may find patching difficult because if the vision in their weaker eye is poor, they may struggle to see well when they are wearing the patch. Again, lots of encouragement with reward charts and stickers can help. Patches of different designs or colours may be available which can also encourage children to wear their patch.

It can take several weeks or months for eye patching to be successful and treatment is usually continued until the vision is normal, or when no further improvement in vision is found.

Sometimes when patching is successful and has been stopped there is a chance that your child's sight may worsen slightly again. Because of this risk they may still need to be carefully monitored by their orthoptist or optometrist even though they don’t need to wear their patch anymore.

Sometimes eye drops are used as an alternative to a patch. Atropine drops blur the vision in your child's good eye enough so that they will start to use the other eye, just like when wearing a patch. Using drops like this doesn't work for all children and you would need to discuss this option with your orthoptist or ophthalmologist to see if it’s possible.

#### Eye exercises

In some types of strabismus, exercises can be useful to strengthen the ability of the eyes to work together. This type of treatment is usually helpful in older children with intermittent strabismus and is normally used together with glasses and/or surgery.

#### Surgery

Some children may require an operation on the eye muscles in order to straighten the strabismus. This is usually needed if the squint is very large and is not improved by the proper correction of glasses.

In a few children who have had strabismus from a very early age, early surgery may be suggested to try and line up the eyes so that they learn to work as a pair and may give some 3D vision. This is normally planned for when a child is about a year old. In older children, surgery may be used to make the eyes look straighter. Surgery can’t improve the level of vision in an amblyopic eye, so glasses or patching may still be needed following the surgery.

The operation usually weakens or strengthens the muscles of the eye, so that the eyes are better aligned. Generally, the risks of strabismus surgery are very low. The most common complication can be an over or under correction of the strabismus, so it’s not uncommon for more than one operation to be necessary. This does not mean that something has gone wrong, but that fine-tuning may be needed to obtain the best results.

Strabismus surgery is performed under general anaesthetic which means your child will be asleep (unconscious) and unable to feel any pain. Normally, the operation is a day case procedure so your child will not usually have to stay in hospital overnight.

#### Botulinum Toxin Injection (Botox)

In rare situations, some children may be offered treatment with a Botox injection. This injection weakens some of the eye muscles so that the eyes are better aligned. In children it can be carried out under general anaesthetic. It is only used in certain types of strabismus, and in certain cases, for example, if someone has had several strabismus surgeries which have not aligned the eyes properly. The effect is usually temporary but may be effective for some types of strabismus in children.

## How can strabismus affect vision?

If your child develops strabismus, it means each eye is looking in a different direction and their eyes are sending different pictures to the brain. Their brain finds it difficult to merge the two pictures into one clear image because the pictures are so different. This means their eyes have stopped working together and would ordinarily, in an adult, cause double vision. However, as your child's visual system is still developing, the brain can easily adapt to stop this double vision by ignoring the image coming from the eye with the strabismus. They will use only the vision from their better/straight eye. The brain ‘switching off’ the vision from the eye with strabismus is called ‘suppression’ and this may cause the vision in that eye to become poor because it is not being used. However, as the better/straight eye usually sees normally, it is likely that a child with strabismus may not seem to have visual problems and will be able to see well at school and home despite their eye condition.

Children can easily adapt to using one eye and it may not be obvious that they have any problems with their eyes and vision because the better eye can see well. This may only be detected by having your child's eye tested by an eye health professional.

### Amblyopia (lazy eye)

Amblyopia (lazy eye) is a condition that can develop during childhood when one eye does not send a good clear image to the brain. This could be because of a strabismus or an inability to focus clearly. As the brain finds it difficult to fuse together the images from the better eye and the weaker eye, it learns to ignore the blurred image from the weaker eye over time. This means the visual pathway of the weaker eye won’t develop very well and the vision in that eye will be blurred even when your child is wearing the correct glasses. An eye which has amblyopia can be called an “amblyopic eye” or may be referred to as a “lazy eye”. Amblyopia generally affects one eye but very rarely it can affect both. Although the vision is not clear, the eye may still be completely healthy in many cases.

A child with strabismus can develop amblyopia in the eye which has the turn because the vision in this eye is not being used by the brain. This is called strabismic amblyopia.

Some children have amblyopia, but they don’t have strabismus. This may be due to one or both eyes being particularly short-sighted (myopic), long-sighted (hypermetropic) and/or having a high astigmatism (astigmatic). Children who have one eye that is much more long sighted, short sighted or astigmatic than the other eye (known as anisometropia) are at risk of amblyopia because they will use the eye that sees better and therefore the other eye will be sending a blurred image to the brain.

Anisometropic amblyopia will be picked up in a vision screening check at school or in a sight test with an optometrist. Otherwise, it can be difficult to know if your child has this condition because with both of their eyes open, they may be able to see very well as they use their better eye to see.

Anisometropic amblyopia is managed by wearing glasses or contact lenses, and your child may also be asked to wear a patch over their better eye some of the time (occlusion therapy) to encourage the vision in their weaker eye to develop. It may seem that your child sees just as well with their glasses on as they did without them, but this is because without their glasses, their better eye was doing all the work. Wearing the correct glasses and patching the better eye at times, encourages your child’s visual pathway to develop in both eyes to improve their vision. Their 3D or binocular vision may also develop to help them judge better how far away things are. Encouraging a good level of vision in both eyes also means they won’t only have their better eye to rely on in the future.

## How is strabismus and amblyopia detected?

Strabismus may be noticed by parents, relatives, friends or your health visitor or GP. Routine checks to detect eye problems in babies and children are usually done at the new-born examination and at the six to eight week review. There should also be a routine eye screening for when children start school (at the age of between four and five years old) to ensure that their vision is good and that their eyes work together.

This screening is usually managed and sometimes carried out by professionals known as orthoptists, who detect and help manage any treatment needed for strabismus. Unfortunately, this screening may not happen in some parts of the country and if you are in any doubt about whether your child's vision has been checked, you should ask at your child's school or nursery. If a screening programme does not exist in your location, it is important to book your child a routine eye test with your local optometrist when they are four years old even if you do not have any concerns regarding their vision.

If you are concerned about your child's eyes at any stage before this check because you have noticed strabismus or other symptoms, then you should discuss this with an optometrist, or ask your child’s GP or health visitor to make a referral to an orthoptist. If you have a strong family history of strabismus, refractive error or amblyopia, you should have your child’s eyes tested regularly by an optometrist when they reach the age of one. If you are worried about your child’s vision under the age of one, then you should discuss this with your GP or health visitor.

## Professionals involved in looking after strabismus and amblyopia

**Orthoptists** are usually based in the eye clinic at the hospital and are recommended to carry out or manage the children's screening service at four to five years old. They are experts in how the two eyes work together (known as binocular vision) and this includes strabismus, double vision and amblyopia. If your child is suspected to have any of these conditions, they are usually one of the first professionals they will see if they are referred to the hospital. Orthoptists are extremely skilled in testing vision in young children, diagnosing strabismus, prescribing patching therapy and any eye exercises that may help. Most hospital appointments about your child's strabismus will be with an orthoptist.

**Ophthalmologists** are hospital-based eye doctors. Their job is to diagnose eye conditions and perform any treatment or surgery that may be needed. If your child has been referred to the hospital for a strabismus, they may see an ophthalmologist to check the health of their eyes and to make sure there is no underlying eye condition causing the strabismus.

**Optometrists** (previously known as ophthalmic opticians) are experts at testing your vision and prescribing glasses. They are also qualified to detect eye conditions or problems, including strabismus and binocular vision problems. If your child is prescribed glasses to help treat strabismus, then you may see an optometrist in the community or at the hospital to supply your child’s glasses. Optometrists can also manage some types of strabismus.

**Dispensing opticians** are qualified in the dispensing and fitting of spectacles and can give professional advice about suitable frames and lenses for children. They usually work in community optical practices and in hospital eye clinics

## What tests will be done?

If your child is suspected of having strabismus, they will normally be referred to an orthoptist or optometrist to have the diagnosis confirmed.

The orthoptist or optometrist will measure how well your child can see, by asking them to name or match letters, pictures or shapes. There are even different ways to measure vision in babies or children with communication difficulties. To check whether there is a strabismus present, they will check your child’s eye movements which can involve covering and uncovering each eye in turn. They will also test your child’s 3D vision (stereopsis).

The assessment for strabismus will also normally involve the use of eye drops. Eye drops are used to relax the focusing (accommodation) of your child’s eyes so their glasses prescription can be as accurate as possible.

The eye drops also make the pupils larger, so once the drops start working, your child may become sensitive to light. You could bring sunglasses or a brimmed hat or cap for your child to wear following the test just in case. They will also feel that their vision is blurred or fuzzy. Again, this is because the drops stop the focusing mechanism from working. The drops may sting a bit when they are first put it, but this wears off within a minute or two. The effects of the eye drops usually wear off after six to eight hours and are fully gone within 24 hours.

Very occasionally, if another cause of strabismus is suspected (other than congenital strabismus or one related to refractive errors), a scan of the eye or brain may be needed. An orthoptist or optometrist can refer your child to an ophthalmologist for any further tests if necessary.

## What is the outlook for children with strabismus or amblyopia?

The treatments for strabismus and amblyopia are generally very effective if the condition is detected and treated early. In these cases, most children will have good vision in each eye in the long-term.

If strabismus or amblyopia is not picked up before the age of about eight years old, it is less likely that treatment will be as effective as if the problem is treated earlier. The level of vision in this eye will vary between individuals and some may retain a reasonable level of sight. Most people who have had strabismus or amblyopia since childhood that hasn’t been successfully treated are totally adapted to having poorer vision in one eye and it doesn’t cause them any problems day to day.

Poor vision in one eye can reduce depth perception which can cause difficulties with judging distances as well as activities such as catching a ball or navigating steps. However, children with a lazy eye are totally adapted to this and their brain finds other ways of judging distances, so these difficulties are generally not a problem. If your child has strabismus or amblyopia, they won’t be able to fully see the 3D effects in 3D films.

In the future, even if they have reduced vision in one eye, your child will still be able to drive a car if the vision in their other eye is unaffected by other eye conditions and meets the driving standard. Some professions, such as being a pilot, police officer, some professional drivers, or some roles in the forces require a certain level of vision to be reached in both eyes and for both eyes to be working together. Keeping this in mind can help you and your child plan their career choice for the future. You can ask your orthoptist or optometrist for more information about certain jobs and whether your child may be affected by this.

Sometimes adults who have had strabismus surgery as a child may need to have further surgery later in life to straighten the eyes again.

## Coping

It’s completely natural to be worried when your child is diagnosed with a strabismus or amblyopia, particularly if you haven’t noticed any problems with their eyes. It can be reassuring to know that prompt diagnosis and assessment of these conditions usually means that they can be dealt with and often treated successfully.

Children whose treatment isn’t as successful may have poor sight in one eye. This may not cause them any problems throughout their life as many people adjust very well to poor vision in one eye only. However, it’s important that someone with good vision in only one eye should have regular eye examinations with an optometrist to make sure that the eye they rely on is healthy. An optometrist will be able to give you advice on how often your child should have their eyes tested.

People who have good vision in only one eye should be very careful to protect their good eye. They should wear eye protection when carrying out activities that can lead to eye injuries such as, DIY, gardening and some sport (e.g. squash, badminton).

## Sources of support

**British and Irish Orthoptic Society**

3rd Floor, Interchange Place151-165 Edmund Street

Birmingham

B3 2TA

Tel: **0121 728 5633**

Email: bios@orthoptics.org.uk

Web: orthoptics.org.uk

**College of Optometrists**

Tel: **020 7839 6000**

Web: **college-optometrists.org**

**RNIB**

105 Judd Street

London

WC1H 9NE

Whether your child has just been diagnosed with strabismus or amblyopia, or has been living with it for a while, at RNIB, we are here to help and support you through your journey.

## Further help and support

Our Helpline is your direct line to the support, advice and services you need. Whether you want to know more about your eye condition, buy a product from our shop, join our library, find out about possible benefit entitlements, or be put in touch with a trained counsellor or make a general enquiry, we’re only a call away.

Give us a call today to find out how we can help you.

**RNIB Helpline**

Tel: **0303 123 9999**

Email: **helpline@rnib.org.uk**

Alexa:you can also say, **“Alexa, call RNIB Helpline”** to an Alexa-enabled device

We’re ready to answer your call Monday to Friday 8am – 8pm and Saturday 9am – 1pm.

You can also get in touch by post or by visiting our website:

**RNIB**

105 Judd Street

London WC1H 9NE

**rnib.org.uk**

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Send your comments to us by emailing us at eyehealth@rnib.org.uk or by writing to:

Eye Health Information service

RNIB

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## Information sources

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