

Patient information from the BMJ Group

Wrinkles

In this section

[What is it?](#)

[What are the symptoms?](#)

[How is it diagnosed?](#)

[How common is it?](#)

[What treatments work?](#)

[What will happen?](#)

[Questions to ask](#)

Wrinkles

Almost everyone gets wrinkles as they get older. There's no cure for wrinkles, but there are treatments that can make your skin look and feel smoother.

We've brought together the best research about wrinkles and weighed up the evidence about how to treat them. You can use our information to talk to your doctor and decide which treatments are best for you.

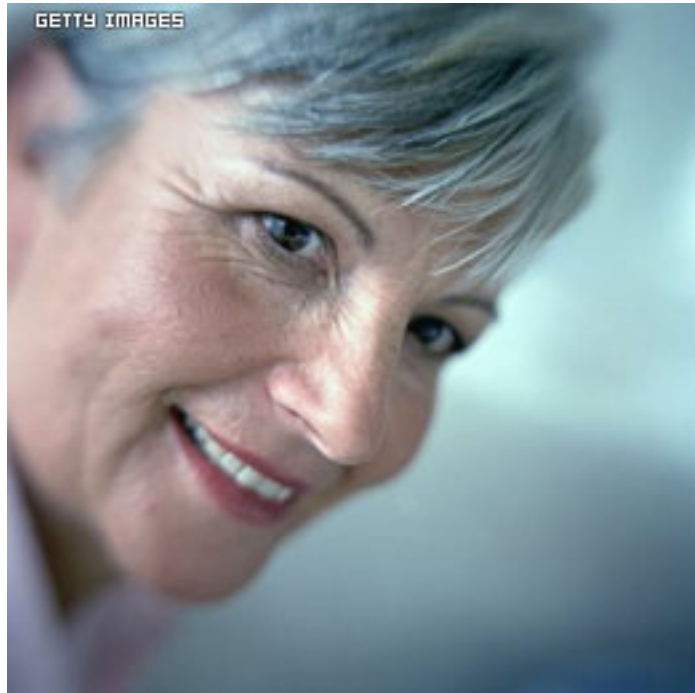
What are wrinkles?

Wrinkles are lines or creases on the surface of your skin. They are a natural part of ageing. But even young people's skin can develop wrinkles if it's damaged by too much sun or by smoking.

Light from the sun contains ultraviolet (UV) rays. These can damage **collagen** and **elastin**, the parts of your skin that keep it smooth, firm, and elastic. Collagen is a protein that makes up a large part of your skin.

Sun damage tends to appear on exposed parts of your body such as your face, your neck, your forearms, and the backs of your hands.

Wrinkles



Wrinkles are lines or creases on the surface of your skin. They are a natural part of ageing.

Smoking also causes wrinkles. ^[1] The toxins in cigarette smoke stop your skin producing as much new collagen.

But the most common cause of wrinkles is simply getting older.

As you get older, your skin gets thinner, more fragile, and less stretchy, so it tends to wrinkle and crease.

Some people wrinkle more than others. This can happen for different reasons.

- **Skin type.** People with fair skin and blue eyes are more susceptible to the damaging effects of the sun than people with darker complexions. ^[2] People with Asian skin types or black skin are less prone to wrinkles than people with white skin. ^[3] ^[4]
- **Dress.** Some people cover up more of their skin than others. Covering up protects against sun damage.
- **Jobs and leisure activities.** Working outdoors increases your exposure to the sun. So do outdoor hobbies, such as sailing or golfing. ^[2]

What are the symptoms of wrinkles?

People with wrinkles aren't ill. But wrinkles can alter the way you look, and this may change the way you feel about yourself.

Wrinkles usually start as fine lines. They tend to get deeper over time.

Wrinkles

Wrinkles are often especially noticeable on your face. Lines tend to form on your face in the places your skin folds when you smile or make other expressions. You may get wrinkles:^[5]

- Across your forehead
- Between your eyebrows (frown lines)
- Around the corners of your eyes (crow's feet)
- Around the corners of your mouth
- On your upper lip
- On your cheeks
- Just in front of your ears.

You may also get lines around the front of your neck and on your hands.

Wrinkles caused by the sun are often accompanied by other signs of sun damage, such as:^[6] ^[7]

- A mottled appearance (patches of slightly different coloured skin)
- Small patches of darker skin, like freckles. These are sometimes called liver spots, although they don't have anything to do with your liver. You may also hear them called **lentigines**
- Hard, flaky, raised, or differently coloured patches of skin. These are called **solar keratoses**
- Dry, rough skin
- Sagging skin.

How common are wrinkles?

It's hard to say exactly how many people have wrinkles. But almost everyone gets them as they get older.

Researchers have looked at how many people get skin damage from the sun. In one Australian study, three-quarters of men and nearly half of women had some sun damage to their skin by the time they were 30.^[8]

Wrinkles

Another study found that between 8 in 10 and 9 in 10 people with fair or moderately fair skin have some sun damage. ^[9]

Dark or black skin is less prone to wrinkle than white skin.

What treatments work for wrinkles?

There are lots of treatments for wrinkles, but few have been properly tested. Be sure to ask about possible side effects before starting any kind of skin treatment for wrinkles.

You'll find all sorts of anti-ageing creams on sale in shops. Common ingredients include moisturiser, sunscreen, or vitamins. Unfortunately, there's very little published research on most of these products, so we haven't been able to include much information about them. Most of the treatments we've looked at are available from a doctor, nurse, or beautician.

- There's no proven way to prevent wrinkles. You're almost certain to get them as you get older. But we do know that **ultraviolet rays** (from the sun or sunbeds) and **smoking** both make wrinkles worse. To read more, see [Preventing wrinkles](#) .
- Skin creams or gels containing **retinoids** (a type of vitamin A) can reduce the appearance of fine wrinkles, but they have side effects. Creams containing retinoids include the prescription drugs tazarotene and tretinoin.
- Lots of **cosmetics** promise to improve or cover up wrinkles. Some contain vitamins that the makers claim can help the appearance of wrinkles. Lots of people use these products, but there's not much evidence that they work.
- Other treatments for wrinkles include **chemical peels**, removing the top layer of skin (which is called **dermabrasion**), **laser treatments**, and **facelifts**. But these haven't been properly tested in high-quality studies.

In the UK, treatments for wrinkles aren't usually available on the NHS. You'll probably have to pay for private health care.

Which treatments work best? We've looked at the best research and given a rating for each treatment according to how well it works.

Treatment Group 1

Treatments for wrinkles

Treatments that work but whose harms may outweigh the benefits

- [Tazarotene gel](#)
- [Tretinoin creams or gels](#)

Wrinkles

- [Isotretinoin gel](#)

Treatments that need further study

- [Laser treatment](#)
- [Chemical peels and acid creams](#)
- [Dermabrasion](#)
- [Facelifts](#)
- [Skin creams with added vitamins](#)
- [Pills containing extract of fish cartilage \(Imedeen\)](#)

Other treatments

We haven't looked at the research on these treatments in as much detail as we've looked at the research on most of the treatments we cover. (To read more, see [Our method](#).) But we've included some information because you may have heard of them or be interested in them.

- [Botulinum toxin \(Botox\)](#)
- [Filler injections with collagen](#)

What will happen to me?

Wrinkles don't affect your health. Most people think of them as a normal part of getting older. But if wrinkles are bothering you, there are treatments that can make your skin look smoother. No treatment can restore your skin completely.

Wrinkles are one of the most visible signs of ageing. They tend to get more obvious over time. Even if you don't really want them, you may feel you can live with your wrinkles. But if you aren't ready to look older, or if your skin has been badly damaged by the sun, there are lots of treatments you can try. Bear in mind that **few have been tested properly** in good-quality studies.

There isn't any good research on how you can prevent wrinkles. But there are a few things you might want to try. To read more, see [Preventing wrinkles](#) .

Treatments:

Tazarotene gel

In this section

Wrinkles

Tazarotene gel can help reduce fine wrinkles and lines.^[13] ^[14] ^[15] You need to rub it on your skin every day.

The **active ingredient** is related to vitamin A. Some doctors think it works by stimulating your skin to produce more of a **protein** called collagen.^[14] Collagen makes up a large part of your skin. Tazarotene may also help new skin cells to grow and replace old ones.

Chemicals that come from vitamin A are called retinoids. Many beauty products contain vitamin A (sometimes called retinol). This is a much milder chemical than tazarotene. You can only get tazarotene on prescription from a doctor. Its brand name is Zorac.

In the biggest study we looked at, about 42 in 100 people said their fine wrinkles improved after 24 weeks' treatment with a cream containing tazarotene.^[14] This compared with 18 in 100 people who used a dummy cream (a **placebo**) without any tazarotene.

About 15 in 100 people using tazarotene noticed their deeper wrinkles getting better. This compared with 8 in 100 people who used a dummy cream.

We don't know if the benefits last once you stop using tazarotene. The studies we found only lasted six months.

All retinoids can irritate your skin. If you use creams and gels containing tazarotene, your skin may go red, itch, or even peel. These side effects can be unpleasant, but they're rarely serious. Any irritation usually stops after a couple of weeks.^[14]

Tazarotene can make your skin get sunburnt faster than normal.^[16] You need to avoid the sun or wear sunscreen while you're using tazarotene. And don't put the gel on sunburnt skin. Ask your doctor for advice about using this treatment safely.

If you're pregnant, using tazarotene could **harm your baby**.^[16] If there's a chance you could become pregnant, make sure you use contraception.

Tretinoin creams or gels

In this section

Tretinoin is a retinoid (a treatment that's related to vitamin A). It comes as a cream or gel that you put on your skin.

Lots of beauty products contain vitamin A (sometimes called retinol). But the form of vitamin A in beauty products is much milder than tretinoin. Tretinoin is available only on prescription from a doctor. The brand name is Retin-A.

Lots of studies show that creams containing tretinoin improve the appearance of fine wrinkles.^[17] ^[18] But some of the studies were small, didn't last very long, or had other problems that make the results less reliable.

You need to use tretinoin regularly for three months to six months.^[17]

Wrinkles

Like other retinoids, tretinoin can irritate your skin.^[17] ^[18] You may notice redness, itching, or stinging at first. But these side effects soon go away. Some people notice dry or peeling skin that peaks after about three months and lasts until you stop using the tretinoin cream.

Tretinoin can make your skin burn in the sun faster than normal.^[19] You need to avoid the sun or wear sunscreen while you're using tretinoin. And don't put the cream or gel on sunburnt skin. Ask your doctor for advice about using this treatment safely.

If you're pregnant, using tretinoin could **harm your baby**.^[19] If there's a chance you could become pregnant, make sure you use contraception.

Isotretinoin gel

In this section

Isotretinoin (brand name Isotrex) is a retinoid (a chemical that comes from vitamin A). It is similar to the retinoid [tretinoin](#). It is available only on prescription from a doctor. If you use isotretinoin gel regularly, it can improve the appearance of your skin. But it can cause unpleasant side effects.^[17] ^[20]

In one study:

- More than 5 in 10 people using isotretinoin got peeling skin
- Just under 5 in 10 got itching
- Up to 7 in 10 got a burning sensation on their skin
- Up to 1 in 10 had severe skin reactions.

For some people, the side effects of isotretinoin are so bad they stop using it.^[17] ^[20]

If you're pregnant, using isotretinoin could **harm your baby**.^[19] If there's a chance you could become pregnant, make sure you use contraception.

Laser treatment

In this section

Lasers are high-energy light beams. Surgeons can use a laser to remove the top layer of skin. The idea is that the skin grows back smoother.

You may need a sedative or a **local anaesthetic** to help with any pain during treatment. You'll need to wear goggles to protect your eyes during surgery. And you'll need about

Wrinkles

two weeks at home to recover afterwards.^[21] The results you get may depend on the skill and experience of your surgeon.^[22]

Two studies compared laser treatment with facial peels and dermabrasion. But the results were mixed and it's not clear which worked best. None of these treatments have been shown to work better than no treatment at all.^[17] ^[23]

You may have some side effects:

- Your skin could be red for several months^[23]
- Scarring is also common, although it usually gets completely better in a few weeks^[24]
- You may get spots or your skin may change colour in the treated area. Retinoid creams like [tretinoin](#) can help with spots.

Several different kinds of laser can be used to treat wrinkles. The research we found was poor, but it suggests there's little difference between the lasers.^[25]

If you decide to have this treatment, make sure the clinic you choose is registered with the Care Quality Commission. Clinics providing laser skin treatments must register by law. You can check at the Commission's website (<http://www.cqc.org.uk>).

Chemical peels and acid creams

In this section

Chemical peels use an acid to strip away the top layer of your skin. The idea is that this encourages new, smoother skin to grow.

Peels that remove only the very top layer of your skin are available as home products or from a beautician. They only have a short-term effect. Deeper chemical peels that remove more of your skin can be done by a doctor or nurse.

Some chemical peels contain the chemicals glycolic acid or lactic acid. You can also get creams or moisturisers that contain smaller amounts of these chemicals. Usually, with the products you buy yourself, up to 10 percent of the cream is glycolic or lactic acid. The rest of the cream may be made of water, moisturisers, and other chemicals.

Most chemical peels haven't been tested properly in good-quality studies. Two studies looked at creams containing small amounts of glycolic acid.^[17] One study found that these creams didn't help to reduce wrinkles. The other found that they did, but only a tiny amount. A basic cream without any glycolic acid worked almost as well.

One study looked at lactic acid cream.^[17] It helped to reduce wrinkles a small amount, but people using a cream without any active ingredient improved almost as much.

Wrinkles

The chemicals used in some peels and creams can make your skin more sensitive to the sun.^[26] It's important to protect your skin from sunlight if you're using these treatments. It's best to use a sunscreen that's at least factor 15. A hat and sunglasses also offer protection from the sun.

Chemical peels or acid creams can make your skin turn red and feel sore.^[23] ^[27] In one small study of chemical peels, the redness lasted for more than two months. Chemical peels may also cause temporary scarring.^[23]

Dermabrasion

In this section

Dermabrasion rubs off the top layer of your skin using a spinning wire brush. You may need a **local anaesthetic** to numb the area and a sedative to help you relax.

We don't know how good dermabrasion is at removing wrinkles. It has never been properly tested in good-quality studies. And it can cause side effects. In one study, people had red, sore-looking skin for an average of two and a half months after treatment.^[28] Dermabrasion must only be done by a doctor.

A less drastic treatment that removes only the very top layer of skin cells is called microdermabrasion. For this, a jet of tiny crystals is directed at your face from a small nozzle. They're vacuumed away immediately. It's a bit like sand-blasting. It can be done by a beauty therapist.

Some home beauty products contain a mild abrasive that aims to rub off some cells from the top layer of your skin. They come as creams containing small pieces of grit, which you use to wash your face. We don't know how well these work.

Facelifts

In this section

Facelifts are a well-known treatment for wrinkles. But we didn't find any good-quality studies looking at whether a facelift helps with wrinkles.

There are several ways of doing a facelift. Most people have a **general anaesthetic** to make them sleep. If you have a **local anaesthetic** you will also be given a drug to help you relax (a sedative).

In one type of operation, a surgeon makes a cut along the hairline at the top of your forehead and behind your ears.^[29] Some of the fat is removed from under your skin, and some excess skin may also be removed. The skin is then pulled into its new, tighter position and sewn into place.

You'll probably have swelling, bruising, and tenderness for a few weeks.^[29] Your stitches will be taken out after a week or so. You'll have a scar, but it will fade in time and should

Wrinkles

be hidden by your hair. More modern surgical techniques, such as keyhole surgery, can be used to reduce scarring.

How good and how safe a facelift is will depend partly on the experience of the surgeon doing the operation. ^[22]

You'll need to stay out of the sun or use very high-factor sunblock for several weeks after your operation. ^[29]

A facelift can go wrong, just like any other operation. Be sure to ask about the risks as well as the potential benefits before agreeing to surgery.

Plastic surgery is done on the NHS to repair damage that's happened because of disease, an accident, or surgery. For example, if you are badly burnt, you may have surgery to help restore your appearance. Plastic surgery may also be offered to correct a problem you have been born with. These types of operation are often called plastic surgery or reconstructive surgery.

If you choose to have surgery, such as a facelift, to make yourself look younger, it may be referred to as aesthetic plastic surgery or cosmetic surgery. For this, you'll usually need to pay for private treatment. Cosmetic surgery isn't usually available on the NHS. ^[29]

Although you'll need to see a private doctor, it's a good idea to see your GP first. Your GP will be able to give you advice, and discuss how your overall health might affect the operation you're thinking about.

The Department of Health gives the following advice to people considering cosmetic surgery. ^[29]

- Make sure your cosmetic surgery provider is registered with the Care Quality Commission. They must be registered by law. You can read inspection reports on all private health care providers at the Care Quality Commission's website (<http://www.cqc.org.uk>).
- Ask about the qualifications and experience of the doctor who'll be doing the operation. You can ask to see before and after photos of their previous operations.
- Make sure the person giving you advice is a doctor or nurse. They'll be able to give you more detailed advice than other members of staff.
- Ask for the full details of the operation, including what kind of **anaesthetic** you'll need, how long you'll take to recover, and how likely it is you will have problems or side effects.
- Think about your reasons for having the operation. Are you doing it for yourself or for someone else? Are you likely to get the benefits you're hoping for?

Skin creams with added vitamins

In this section

You can buy lots of anti-wrinkle and anti-ageing products that contain vitamin C or vitamin E. Both of these vitamins are antioxidants, chemicals that might help protect your skin from the damaging effects of age, sun, or smoking. But there's no good research to show whether they work.

We found one small study (a **randomised controlled trial**), testing a cream containing vitamin C.^[30] But the study can't tell us very much. It didn't look at many people, and one-third of them dropped out before the study finished. We found no good studies that tested vitamin E.

Many beauty products contain a moisturiser or a sunscreen. Both of these things might have a small effect on wrinkles, regardless of the other ingredients in the product.^[31]

Pills containing extract of fish cartilage (Imedeen)

In this section

You can buy pills containing fish extract that claim to improve the appearance of your skin. One brand is called Imedeen. There's been some research on these pills, but not enough to say whether they work.

The largest and most reliable study found that fish-extract pills were no better than a dummy treatment (a **placebo**).^[32] There was no effect on people's wrinkles even after three months of treatment. One study did suggest that fish-extract pills might help with fine wrinkles, but it only looked at 30 women, which makes the results less reliable.^[33]

In one study, about one-quarter of the women taking fish-extract pills got some side effects, including spots, greasy skin, or weight gain.^[32] But roughly the same number of women taking a placebo got side effects too, so we can't say whether the treatment caused these problems.

Botulinum toxin (Botox)

In this section

Botulinum toxin is an injection that aims to smooth out wrinkles.^[29] You may have to wait a few weeks before the injections start to work. The benefit is temporary and goes away after three or four months.^[34]

In the UK, doctors and specially trained nurses can prescribe botulinum toxin to treat wrinkles. Other health care staff can give the injections if they've been properly instructed by a doctor or nurse. However, it's unlikely that you'll be able to get this treatment on the

Wrinkles

NHS.^[29] Botulinum toxin is sometimes prescribed on the NHS for people who have muscle twitches.^[35] But you'll need to see a doctor privately if you want it as a cosmetic treatment.

The most widely known brand name for botulinum toxin is Botox. Other brand names are:

- Azzalure
- Bocouture
- Dysport
- NeuroBloc
- Vistabel
- Xeomin.

The brands that are marketed in the UK for treating wrinkles are called Azzalure, Bocouture, and Vistabel. They're recommended for treating vertical lines on the forehead, but a doctor may also suggest them for other kinds of wrinkles.

Botulinum toxin reduces the movement of muscles so that they relax and smooth away wrinkles. It's injected carefully, because the idea is to affect only the muscles that are causing wrinkles. However, the injections can sometimes affect other muscles too. This may cause side effects, like drooping eyelids or muscle weakness.^[29] If these side effects do happen, they should wear off in a few months. But if you get any problems with swallowing, talking, or breathing after one of these injections, get medical help straight away.^[36]

Filler injections with collagen

In this section

Collagen is a chemical that can be injected just under your skin to plump it up and hide wrinkles. Some brands of collagen come from cows or pigs. Human collagen can be made from skin cells grown in a laboratory. Non-animal substances such as hyaluronic acid can also be used.

Collagen and other filler chemicals are eventually absorbed by your body. The effects of filler injections usually last about six months.^[29]

A few people get an **allergic reaction** to filler injections. And there may be some pain, redness, bruising, or swelling in the week or so after treatment.^[37] ^[38]

Wrinkles

You should make sure that your injection is done by someone who is properly trained. If a filler is injected into the wrong place, it could block a blood vessel and damage your skin or other tissue in your face.^[38]

Further informations:

Preventing wrinkles

There's no scientifically proven way to prevent wrinkles. There are a few things you can try.

- **Using high-factor sunscreen** helps to protect your skin from the sun, but we found no studies testing whether or not sunscreens prevent wrinkles.^{[10] [11]}
- Lotions and creams containing **vitamin C** or **vitamin E** are also popular, but they haven't been tested in good-quality studies.
- **Avoiding too much sun.** The sun can play a part in causing skin cancer, not just wrinkles. So it makes good sense to use sunscreens, cover up, wear a hat, and stay out of strong sunshine.
- **Stopping smoking.** We don't know whether this will help. But we do know that wrinkles are more common in lifelong smokers than in people who've only smoked for a while.^[12] For more information about giving up, see our information on [Smoking](#)

Glossary:

active ingredient

An active ingredient is the substance in a medicine or supplement that causes changes to take place in your body.

proteins

A lot of your body's tissues are made out of proteins. Proteins can be made in your cells. Proteins are also part of the food you eat, particularly meat and dairy products. Your body breaks down the protein you eat into amino acids. Your cells then use these amino acids to build new proteins, which make up muscles, joints, hair and other parts of your body.

placebo

A placebo is a 'pretend' or dummy treatment that contains no active substances. A placebo is often given to half the people taking part in medical research trials, for comparison with the 'real' treatment. It is made to look and taste identical to the drug treatment being tested, so that people in the studies do not know if they are getting the placebo or the 'real' treatment. Researchers often talk about the 'placebo effect'. This is where patients feel better after having a placebo treatment because they expect to feel better. Tests may indicate that they actually are better. In the same way, people can also get side effects after having a placebo treatment. Drug treatments can also have a 'placebo effect'. This is why, to get a true picture of how well a drug works, it is important to compare it against a placebo treatment.

laser

A laser focuses light in a way that makes it able to cut through things. Surgeons sometimes use lasers when they need to do delicate operations.

local anaesthetic

A local anaesthetic is a painkiller that's used to numb one part of your body. You usually get local anaesthetics as injections.

Wrinkles

general anaesthetic

You may have a type of medicine called a general anaesthetic when you have surgery. It is given to make you unconscious so you don't feel pain when you have surgery.

anaesthetic

An anaesthetic is a chemical that blocks the ability to feel sensations like pain or heat. A local anaesthetic blocks the feeling in a specific area of the body. For example, your dentist uses a local anaesthetic like lignocaine in your gums so that you don't feel the pain of having a cavity filled. A general anaesthetic makes you completely unconscious and is usually used only in a carefully controlled environment like an operating room.

randomised controlled trials

Randomised controlled trials are medical studies designed to test whether a treatment works. Patients are split into groups. One group is given the treatment being tested (for example, an antidepressant drug) while another group (called the comparison or control group) is given an alternative treatment. This could be a different type of drug or a dummy treatment (a placebo). Researchers then compare the effects of the different treatments.

allergic reaction

You have an allergic reaction when your immune system overreacts to a substance that is normally harmless. You can be allergic to particles in the air you are breathing, like pollen (which causes hay fever) or to chemicals on your skin, like detergents (which can cause a rash). People can also have an allergic reaction to drugs, like penicillin.

Sources for the information on this leaflet:

1. Grady D, Ernster V. Does cigarette smoking make you ugly and old? *American Journal of Epidemiology*. 1992; 135: 839-842.
2. Green AC. Premature ageing of the skin in a Queensland population. *Medical Journal of Australia*. 1991; 155: 473-474.
3. Tsukahara K, Fujimura T, Yoshida Y, et al. Comparison of age-related changes in wrinkling and sagging of the skin in Caucasian females and in Japanese females. *Journal of Cosmetic Science*. 2004; 55: 351-371.
4. Nouveau-Richard S, Yang Z, Mac-Mary S, et al. Skin ageing: a comparison between Chinese and European populations. A pilot study. *Journal of Dermatological Science*. 2005; 40: 187-193.
5. Lemperle G, Holmes RE, Cohen SR, et al. A classification of facial wrinkles. *Plastic and Reconstructive Surgery*. 2001; 108: 1735-1750.
6. Green AC. Premature ageing of the skin in a Queensland population. *Medical Journal of Australia*. 1991; 155: 473-474.
7. Bukvic Mokos Z, Lipozencic J, Pasic A, et al. Laser therapy for solar lentigines: review of the literature and case report. *Acta Dermatovenerologica Croatica*. 2006; 14: 81-85.
8. Green AC. Premature ageing of the skin in a Queensland population. *Medical Journal of Australia*. 1991; 155: 473-474.
9. Maddin S, Lauharanta J, Agache P, et al. Isotretinoin improves the appearance of photodamaged skin: results of a 36-week, multicenter, double blind, placebo-controlled trial. *Journal of the American Academy of Dermatology*. 2000; 42: 56-63.
10. Alsarraf R. Outcomes research in facial plastic surgery: a review and new directions. *Aesthetic Plastic Surgery*. 2000; 24: 192-197.
11. Boyd AS, Naylor M, Cameron GS, et al. The effects of chronic sunscreen use on the histologic changes of dermatoheliosis. *Journal of the American Academy of Dermatology*. 1995; 33: 941-946.
12. Grady D, Ernster V. Does cigarette smoking make you ugly and old? *American Journal of Epidemiology*. 1992; 135: 839-842.
13. Kang S, Leyden JJ, Lowe NJ, et al. Tazarotene cream for the treatment of facial photodamage. *Archives of Dermatology*. 2001; 137: 1597-1604.
14. Phillips TJ, Gottlieb AB, Leyden JJ, et al. Efficacy of 0.1% tazarotene cream for the treatment of photodamage. *Archives of Dermatology*. 2002; 138: 1486-1493.
15. Lowe NJ, Gifford M, Tanghetti E, et al. Tazarotene 0.1% cream versus tretinoin 0.05% emollient cream in the treatment of photodamaged facial skin: a multicenter, double-blind, randomized, parallel-group study. *Journal of Cosmetic Laser Therapy*. 2004; 6: 79-85.

Wrinkles

16. British National Formulary.Tazarotene.Section 13.5.2. British Medical Association and Royal Pharmaceutical Society of Great Britain. Also available at <http://bnf.org> (accessed on 18 November 2013).
17. Samuel M, Brooke RC, Hollis S, et al.Interventions for photodamaged skin (Cochrane review).In: The Cochrane Library. Wiley, Chichester, UK.
18. Weiss JS, Shavin JS, Nighland M, et al.Tretinoin microsphere gel 0.1% for photodamaged facial skin: a placebo-controlled trial.Cutis. 2006; 78: 426-432.
19. British National Formulary.Topical preparations for acne.Section 13.6.1. British Medical Association and Royal Pharmaceutical Society of Great Britain. Also available at <http://bnf.org> (accessed on 18 November 2013).
20. Sendagorta E, Lesiewicz J, Armstrong RB.Topical isotretinoin for photodamaged skin.Journal of the American Academy of Dermatology. 1992; 27: 15-18.
21. Khatri KA, Ross V, Grevelink LM, et al.Comparison of Erbium: YAG and carbon dioxide lasers in resurfacing of facial rhytides.Archives of Dermatology. 1999; 135: 391-397.
22. Samuel M, Brooke R, Griffiths C.Wrinkles.December 2008. Clinical Evidence. (Based on April 2008 search). Available at <http://www.clinicalevidence.com/ceweb/conditions/skd/1711/1711.jsp> (accessed on 18 November 2013).
23. Reed JT, Joseph AK, Bridenstine JB.Treatment of periorbital wrinkles: a comparison of the SilkTouch carbon dioxide laser with a medium-depth chemical peel.Dermatological Surgery. 1997; 23: 643-648.
24. Chew J, Gin I, Rau KA, et al.Treatment of upper lip wrinkles: a comparison of 950 usec dwell time carbon dioxide laser with unoccluded baker's phenol chemical peel.Dermatologic Surgery. 1999; 25: 262-266.
25. Newman JB, Lord JL, Ash K, et al.Variable pulse erbium: YAG laser skin resurfacing of perioral rhytides and side-by-side comparison with carbon dioxide laser.Lasers in Surgery and Medicine. 2000; 26: 208-214.
26. U.S. Food and Drug Administration.Alpha hydroxy acids in cosmetics.September 2013. Available at <http://www.fda.gov/cosmetics/productandingredientsafety/selectedcosmeticingredients/ucm107940.htm> (accessed on 18 November 2013).
27. Stiller MJ, Bartolone J, Stern R, et al.Topical 8% glycolic acid and 8% L-lactic acid creams for the treatment of photodamaged skin: a double-blind vehicle-controlled clinical trial.Archives of Dermatology. 1996; 132: 631-636.
28. Gin I, Chew J, Rau KA, et al.Treatment of upper lip wrinkles: a comparison of the 950 microsec dwell time carbon dioxide laser to manual tumescent dermabrasion.Dermatologic Surgery. 1999; 25: 468-474.
29. Department of Health.Cosmetic surgery: information for patients.August 2006. Available at http://webarchive.nationalarchives.gov.uk/20080814090248/dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_4125519 (accessed on 18 November 2013).
30. Traikovich SS.Use of topical ascorbic acid and its effects on photodamaged skin topography.Archives of Otolaryngology - Head and Neck Surgery. 1999; 125: 1091-1098.
31. Phillips TJ, Gottlieb AB, Leyden JJ, et al.Efficacy of 0.1% tazarotene cream for the treatment of photodamage.Archives of Dermatology. 2002; 138: 1486-1493.
32. Kieffer ME, Efsen J.Imedeena in the treatment of photoaged skin: an efficacy and safety trial over 12 months.Journal of the European Academy of Dermatology and Venereology. 1998; 11: 129-136.
33. Eskelinen A, Santalahti J.Special natural cartilage polysaccharides for the treatment of sun-damaged skin in females.Journal of International Medical Research. 1992; 20: 99-105.
34. U.S. Food and Drug Administration.Botox® cosmetic (onabotulinumtoxinA).July 2009. Available at http://www.accessdata.fda.gov/drugsatfda_docs/label/2009/103000s5109s5210lbl.pdf (accessed on 18 November 2013).

Wrinkles

35. British National Formulary. Botulinum A toxin. Section 4.9.3. British Medical Association and Royal Pharmaceutical Society of Great Britain. Also available at <http://bnf.org> (accessed on 18 November 2013).
36. Medicines and Healthcare Products Regulatory Agency. Botulinum toxin products: rare but serious risk. October 2007. Available at <http://www.mhra.gov.uk/Safetyinformation/DrugSafetyUpdate/CON079276> (accessed on 18 November 2013).
37. U.S. Food and Drug Administration. FDA approves new product for facial wrinkles. Available at <http://www.fda.gov/ohrms/dockets/dailys/04/july04/071504/04e-0308-app0001-Attachment-A-vol1.pdf> (accessed on 25 November 2013).
38. Inamed Corp. Inamed CosmoDerm human-based collagen implant. Available at http://www.accessdata.fda.gov/cdrh_docs/pdf/P800022S050c.pdf (accessed on 18 November 2013).

This information is aimed at a UK patient audience. This information however does not replace medical advice. If you have a medical problem please see your doctor. Please see our full [Conditions of Use](#) for this content. For more information about this condition and sources of the information contained in this leaflet please visit the Best Health website, <http://besthealth.bmj.com>. These leaflets are reviewed annually.

