



## TRANSCRIPT

### S2.E4 – Contact Dermatitis

**Dr. Blake Mumford:** Welcome to season two of the *Spot Diagnosis*, a podcast about all things dermatological, brought to you by the Skin Health Institute in Melbourne, Australia. I am Dr. Blake Mumford, education and research fellow at the Institute.

**Associate Professor Alvin Chong:** I'm Associate Professor Alvin Chong, director of education and specialist dermatologist. Blake and I are your co-hosts. Because of the COVID pandemic and restrictions, we are recording this podcast by phone conference. We have an interesting topic today, which is contact dermatitis, and a world-renowned guest speaker, Associate Professor Rosemary Nixon. Professor Nixon is a leading expert in contact dermatitis.

She wrote the textbook chapter on allergic contact dermatitis in Bologna's textbook of *Dermatology*. Think Harrison's but for dermatologists. She holds the distinction of being the only person to have Australian qualifications in both dermatology and occupational medicine. In 2017, she was awarded the membership of the Order of Australia and also the highest award of the Australasian College of Dermatologists, the Silver Medal. Professor Rosemary Nixon, welcome to *Spot Diagnosis*.

**Professor Rosemary Nixon:** Delighted to be here.

**Dr. Mumford:** Okay. Ro, our tradition for season two is to ask our guest speaker to share a fun, obscure dermatological fact with our listeners. Does anything come to mind?

**Professor Nixon:** Well, it's believed that famous novelist and playwright Oscar Wilde was the first celebrity to experience allergic contact dermatitis to hair dye. He lived from 1854 to 1900. Records suggest that he was prematurely gray and dyed his hair. He apparently experienced severe intermittent itchy rashes, affecting his face, scalp, arms, and back. PPD or paraphenylenediamine is still a basis of almost all permanent hair dyes and a notorious cause of allergic contact dermatitis, especially in hairdressers. It was introduced as a fur dye in 1883 and subsequently used as an unregulated hair dye. Wilde allegedly died of a chronic ear infection, which may even have been an infective complication of his allergic contact dermatitis affecting his face and scalp.

**Dr. Mumford:** Gosh, the cost of vanity, I guess. I'll just give a brief overview of the history of contact dermatitis.

Contact dermatitis is a type of dermatitis caused by direct skin contact with an external agent and is classified as either *allergic contact dermatitis* or *irritant contact dermatitis*. Irritant contact dermatitis makes up the majority of contact dermatitis around 75% to 80% of cases.

The first descriptions of contact dermatitis can be traced to the papyri of the ancient Egyptians and various notable physicians have made their mark on the field throughout history. In the 17th century, Ramazzini, the Italian physician and father of occupational medicine, observed that laundry women and soap workers developed hand dermatitis due to direct contact with substances.

The British also chipped in their 2c. Willan and his student Bateman gave morphological descriptions of contact dermatitis and described cases of contact dermatitis in shoemakers caused by wax. Where the achievements of the British are mentioned, those of the French cannot be omitted. Pierre Cazenave made a significant contribution by trying to classify contact dermatitis into acute and chronic.

German dermatologist Josef Jadassohn gave the first description of patch testing in 1895, a major milestone in the field. Both allergic contact dermatitis and irritant contact dermatitis manifest as eczematous rashes, but the mechanisms by which they cause the skin inflammation are different.

Let's move on to our first question now. We say that contact dermatitis manifests as an eczematous rash. Ro, can you explain the confusing terminology of eczema and dermatitis?

**Professor Nixon:** It really is very confusing, Blake, because these terms actually do mean the same thing. To make it easier for people to understand, I use the terms "endogenous eczema." There are many different types of eczema, including atopic eczema, which is also called atopic dermatitis; and exogenous contact dermatitis, which is caused by substances contacting the skin. Now, that can be further subdivided into allergic contact dermatitis and irritant contact dermatitis.

**Dr. Mumford:** Okay then. In terms of contact dermatitis, how do the mechanisms of allergic contact dermatitis and irritant contact dermatitis differ?

**Professor Nixon:** These are completely different. Allergic contact dermatitis is an immunological reaction of the delayed hypersensitivity type, which means that we don't see the rash until 4, 8, 24, 40 hours, 48 hours after contact of the allergen with the skin. On the other hand, irritant contact dermatitis is also immunological but in a different way. It's caused by an inflammatory cascade resulting in the release of lots of cytokines or inflammatory chemicals that produce the characteristic features of skin inflammation.

**Dr. Mumford:** People with atopic eczema have an impaired skin barrier function to begin with. Ro, are these people more likely to get contact dermatitis?

**Professor Nixon:** Absolutely. They're much more likely to get irritant contact dermatitis because of that impaired skin barrier that you mentioned. Whether they get more allergic contact dermatitis has been a bit controversial. Immunologically, you might think that they should get less allergic contact dermatitis and more immediate reactions. Because their skin barrier is damaged, they often use a lot of products on their skin. The more things you use, the more likely you are to develop allergies. Overall, it's not that the atopic people probably do have the same rate of allergic contact dermatitis as the rest of the people.

**Dr. Mumford** Ro, could you please paint a picture for our listeners of what does irritant contact dermatitis actually look like?

**Professor Nixon:** Irritant contact dermatitis is really a spectrum. At the acute end are the burns or necrosis that we see on the knees of home handymen who have knelt in cement while doing their DIY work at home on the weekends and present to emergency departments on Sunday night with severe skin blistering and ulceration. As dermatologists, we tend to see chronic irritant contact dermatitis, which is basically a red, scaly, dry, itchy rash, particularly affecting the hands.

**Dr. Mumford:** What about allergic contact dermatitis? Does that look any different?

**Professor Nixon:** Well, that's tricky. It's also red, scaly, itchy, and dry and can affect the hands. Although we may see some more inflammatory changes such as blisters or vesicles, which is small blisters, and sometimes swelling and almost some urticarial features.

**Associate Professor Chong:** Are there any clues from the appearance that can distinguish between irritant or allergic contact dermatitis or even atopic eczema for that matter?

**Professor Nixon:** Irritant contact dermatitis is often localized, particularly to the hands, whereas allergic contact dermatitis may spread. That spread may be for one of two reasons. Allergens may be transferred from the hands to other parts of the body or there may be an "id" or hypersensitivity reaction where the body goes out in sympathy to the presence of this intense inflammatory skin reaction.

**Dr. Mumford:** It's time for our first **skin tip**. It is difficult to reliably, clinically distinguish between irritant contact dermatitis and allergic contact dermatitis.

**Associate Professor Chong:** Okay. You can't tell the difference based on the appearance alone, but are there other diagnostic clues that might point to a diagnosis of allergic contact dermatitis?

**Professor Nixon:** Definitely. Many of the clues come from the history. Of course, when we see the patients, they may not always have the rash. Allergic contact dermatitis preferentially affects thinner areas of the skin such as the eyelids and neck. Classically, shampoos cause reactions on

the eyelids, not the scalp because the eyelid's skin is thinner than the scalp. Similarly, nail polish causes reactions on the neck or the eyelids and not around the nails.

The timing and the episodic nature of the rash may also suggest allergic contact dermatitis. I remember one patient who used to get a rash on the weekends, particularly around her eyes. She decided that it was the carpet that was causing the rash when she spent time at home over the weekends and was about to rip up her carpet, which was going to cost her \$7,000. We found out that she was actually allergic to nickel in her work glasses that she used during the week.

The rash got worse and worse and worse towards the end of the week. It was actually worse on the weekend. Historical clues like timing can be very helpful in making a clinical diagnosis. We're also very receptive to the fact that if people had never had a rash before, they've never had any skin problems, they've never had any eczema, then they possibly more likely to have allergic contact dermatitis.

**Dr. Mumford:** You've mentioned nickel there. What are the common allergens that cause allergic contact dermatitis?

**Professor Nixon:** Well, at the Skin Health Institute, we've got data from my occupational dermatology clinic since 1994. Every year, we crunch our numbers. Last year, we found that six of the 10 most common allergens were perfume or fragrances. There's a particular emphasis these days on "clean, green" and should I say "smelly" products and we're seeing more and more allergies to perfumes in skincare products. We also see reactions to nickel in cheap jewelry, chromate in leather or cement, rubber chemicals in gloves, preservatives such as methylisothiazolinone, which has caused a veritable epidemic of reactions to baby wipes in recent years and other workplace-based substances such as epoxy resins.

**Dr. Mumford:** You mentioned concrete as a skin irritant. What other common skin irritants that cause irritant contact dermatitis?

**Professor Nixon:** Well, surprisingly, the most irritating thing for the skin is water. Wet, dry, wet, dry, wet, dry contact with the skin is the most important cause of irritant contact dermatitis. After that, we have detergents and cleaning agents and soaps. Soaps are very alkaline. They're very good for getting the dirt off the knees of toddlers, but they're also very irritating to the skin, which is why in dermatology, we often talk about soap substitutes, which are pH balance. We have other irritants such as oils, solvents, dusts, fibers, and physical irritants such as heat and sweating and restrictive gloves and friction and low humidity.

**Associate Professor Chong:** Oh, sometimes patients are convinced that a favorite face cream or product couldn't be the cause of their contact dermatitis because they've been using it for years. I actually do see quite a lot of patients who come in with facial rashes from products that they have sworn by for 20 years. Is this something that you encounter a lot?

**Professor Nixon:** Definitely. The fact is that can cause sensitization or becoming allergic or exposure to a particular allergen, the concentration of that allergen, the duration of exposure, as well as individual susceptibility. Now, it's said that there are over 4,000 allergens out of about 100,000 chemicals. Allergens need to be a certain size and shape to get through the skin to cause an allergic reaction. The other factor that's important there is skin barrier damage. If the skin barrier is damaged, then that allergen will find it easier to get through the skin.

**Dr. Mumford:** That brings us to our next [skin tip](#). In some patients, it can take years of chronic, low-grade exposure before sensitivity to an allergen develops.

**Associate Professor Chong:** Ro, can the distribution of the dermatitis provide clues to the likely allergen?

**Professor Nixon:** Absolutely. Often, patients can work this one out themselves and will not need to go to a doctor, let alone a dermatologist. People will often realize that they've reacted to a deodorant although they often blame the aluminium and not the perfume, which is the usual cause. Similarly, they may work out that they're reacting to a belt buckle.

When it gets complicated is often with the hands because the hands are in contact with many substances such as wet wipes, gloves, moisturizing creams. There are certain other patterns such as allergic contact dermatitis to hair dyes, which is quite prevalent in older Asian males. Rather than presenting with a rash on the scalp, they often present with a rash scalp margins or even the eyelids. There are many classic presentations and then there are a little bit more complicated ones as well.

**Dr. Mumford:** It sounds like sometimes you have to pretend to be like Professor House or Sherlock Holmes to try and find out the offending allergen, is that right?

**Professor Nixon:** Absolutely. We like to think of ourselves as Sherlock Holmes. The biggest clue is that initial side of the rash. That gives us a clue where the allergic contact dermatitis might have started. I remember one patient who had this patchy dermatitis on her hands. It didn't really look as if it was in any particular distribution, but she reacted to nickel and then she brought in her frying containers. She worked in a fast-food shop and fried the chips.

When we looked at the distribution of the rash, it exactly matched the handle of the frying container, which was a stainless steel coating which had broken down to expose nickel. Her rash was entirely explained by a nickel distribution.

**Professor Nixon:** Another example where we tracked down the most surprising allergen was in the case of a maintenance worker. He described rashes all over his body. Occasionally, on his scalp. Occasionally, on his arm. Occasionally, his hands. Really, from taking the history, I had no idea what was the cause of the rash because he did lots of different jobs all around the factory and I couldn't work out one particular exposure. Nevertheless, when we tested him, he reacted to tea

tree oil. It turned out that every night after he got home, he put tea tree oil on any little cut from the day's activities and that was the cause of his allergic reaction.

**Associate Professor Chong:** Rosemary, I think occupation would surely play an important role for a lot of these patients who have some kind of dermatitis, particularly in their hands?

**Professor Nixon:** Absolutely. Wet work often plays a role in initiating dermatitis. We see that in wet work professions such as hairdressers, nurses, food handlers, and cleaners. What we often find is because of that skin barrier damage from the wet work, that facilitates sensitization and the occurrence of allergic contact dermatitis. It's quite common, for example, to see a cleaner who initially gets irritant contact dermatitis, then wears rubber gloves a bit too late to protect their hands and then develops allergic contact dermatitis from the rubber chemicals as well.

One particular problematic profession for us is hairdressing. Unfortunately, hairdressers are exposed to wet work when they wash here at the basin, but then all the major hairdressing allergens, dyes, hairdressing bleach, and perm solution allergens as well. We call that the hairdressing trifecta. Unfortunately, they have irritants and allergens as well. Healthcare workers are a little bit in the same boat because they have skin barrier damage from lots of hand washing and then there are lots of weak allergens, but nevertheless allergens in some of the skincare cleansers, lanoline, and various emulsifying agents.

We've shown in the past that many people are just doing their day-to-day work using the product supplied at work and they develop allergic contact dermatitis. Unfortunately, sometimes allergic contact dermatitis can have a very poor prognosis. That particularly involves our cement workers who become allergic to chromate in cement and they can develop a persistent post-occupational dermatitis, which is an ongoing rash which is initiated by that occupational exposure.

**Dr. Mumford:** At the start of this episode, you mentioned that allergic contact dermatitis was a type IV or delayed hypersensitivity reaction. Can immediate hypersensitivity or type I reactions manifest in the skin?

**Professor Nixon:** They certainly can, Blake. Type I or immediate hypersensitivity reactions involve the release of histamine. We more commonly see these reactions as being important in asthma and the hay fever and food allergies and the allergens in grasses and pollens and foods. However, there are certain instances where this type of mechanism can affect the skin and cause an immediate urticaria reaction called contact urticaria.

The main culprits for us, are latex allergy. We certainly saw an epidemic of latex allergy in the '90s and the noughties from a glove powder, facilitated by glove powder in latex gloves. I always say that latex allergies are forgotten, not gone. We still see cases. Other causes of contact urticaria include ammonium persulfate or hairdressing bleach in the hairdressers who may present with

hay fever and asthma as well as skin problems and food handlers who react to various protein-containing foods.

**Dr. Mumford:** Look, I hate to mention it, but there is a bit of a meme about dermatology. If you don't know what the rash is based on what it looks like, you just biopsy it and it tells you. Is skin biopsy helpful to diagnose contact dermatitis?

**Professor Nixon:** This is one area of dermatology that skin biopsies don't really help. We can't reliably distinguish eczema and contact dermatitis histologically, but we do have a test which we can do, which is our gold standard and that's patch testing.

**Dr. Mumford:** I think that brings us to another **skin tip**. Patch testing is the gold standard diagnostic test for allergic contact dermatitis.

Ro, can you explain a bit about what patch testing involves and how is it different to skin prick testing?

**Professor Nixon:** In patch testing, we're basically reproducing exposure of allergens on the skin. We have to do this for 48 hours. Now, we're not pricking the skin. We're just applying these allergens and specialized test chambers to the skin. We leave them on for 48 hours. We take them off and then we have another look at the back where this testing is performed after another 48 hours.

That's the most important reading of the reaction, because in patch testing, we're looking at an epidermal reaction. This is different to prick testing, which involves pricking the skin in order to look at a dermal reaction, which is the release of histamine from mast cells. Patch testing and prick testing are quite different. Prick testing is done over 15 minutes on the forearm and patch testing is done over 96 hours on the back.

**Dr. Mumford:** Who actually performs the patch testing for contact dermatitis? Should they be referred to a allergists and dermatologists?

**Professor Nixon:** Basically, the rule is that dermatologists do skin. Sometimes people will be inappropriately referred to allergists because they have a suspicion that they might be allergic to something, but they're not sure what. Traditionally, in Australia, allergists do prick testing, which is used for the investigation of aspirin and hay fever. Dermatologists do patch testing.

**Associate Professor Chong:** Ro, so you do the patch tests in someone that you suspect has contact dermatitis. How do you actually interpret the results of patch testing? If someone reacts to an allergen, is it always relevant or significant?

**Professor Nixon:** Interpreting the results of patch testing, I have to say, does require a bit of experience. We generally test with what we call or what we have devised, which is the Australian baseline stick series, which is 60 of the most common and relevant allergens in our patient

population. We worked this out over many years. In addition, we test with other chemicals that they might be exposed to, be it from their skincare products, fragrances, healthcare worker series, hairdressing series, whatever.

Each allergen has their own particular way of reacting. In addition, some allergens will irritate the skin. We also have to interpret the reactions of the patient's own contactants or substances, which they bring in for patch testing which we have to dilute. Patch testing isn't quite as easy as you might expect. Once we have got reaction to an allergen though, then we have to decide if that reaction is actually the cause of the problem.

For instance, someone might react to nickel, but that could be because they reacted to cheap jewelry years ago and it's not the cause of their current rash. We have to do an exposure assessment to see where they might be exposed to that allergen that they reacted to. Now, that might be as simple as reading the labels on the products that they've bought, but it might be reading material safety data sheets. It might be ringing up the workplace. It might involve a lot of work. My colleagues in Sweden are very good at analyzing the samples for the presence of the allergen. Unfortunately, we don't have access to that sort of technology here.

**Dr. Mumford:** It sounds like there's a bit of detective work involved there, Ro. After you diagnose contact dermatitis though, how do you treat it? Is it simply a matter of avoiding the offending agent or is there other treatment involved?

**Professor Nixon:** It depends. Sometimes the offending allergen is very easy to avoid such as epoxy resins, which are generally not contacted at home as much as the workplace, but more often than not is quite difficult. That is because there may be multiple contributing factors to the dermatitis. It's perhaps not as easy as it sounds.

There may be a cause of allergic contact dermatitis, but there may also be some underlying irritant contact dermatitis with skin barrier damage and possibly an immediate hypersensitivity reaction as well and possibly some underlying atopic eczema. Particularly when there are cases where there are multiple factors, it's going to take time for the skin barrier to improve.

**Associate Professor Chong:** Ro, can you ever develop tolerance or hardening to a skin irritant?

**Professor Nixon:** Sometimes, Alvin, we see that in the case of fiberglass that it gets better with time, but perhaps, generally, no. Basically, people become worse with more exposure to skin irritants and especially if they've got that background of atopic eczema, which means that their skin just can't cope very well with skin irritants.

**Dr. Mumford:** Is it possible to desensitize someone to a particular allergen so they no longer react to it? This is particularly important for people whose careers may depend upon it.

**Professor Nixon:** Unfortunately, it's not possible to desensitize people to type IV or delayed hypersensitivity reactions. However, it is for type I reactions. Some causes of asthma and hay

fever, pollens, molds, grasses, you can do desensitization for that, but not for the causes of allergic contact dermatitis.

**Dr. Mumford:** We've talked about how contact dermatitis can often be related to a person's occupation. Sadly, sometimes people have to give up on very successful careers. Ro, could you share with our listeners how contact dermatitis can impact on a patient's life?

**Professor Nixon:** Unfortunately, it can have very severe outcomes. I think the group that we see with the most common sad outcome is hairdressers. Unfortunately, people who want to be hairdressers really want to be hairdressers and they don't want to be anything else. They also don't have so many options available to them. On the other hand, when nurses have skin problems, they do have other opportunities such as in administration or education.

We find that some people, for whatever reason, just have a very poor prognosis. This is particularly been associated with people who get allergic to chromate in cement. We call that persistent post-occupational dermatitis. Often these people do not get better despite avoiding everything that we found they're allergic to. In some of our work, we found that smoking might be a risk factor for that condition.

**Associate Professor Chong:** At the time of recording this podcast, Ro, COVID-19 is still a huge public health issue. One of the core parts about reducing the spread include frequent hand washing. Guess what? I'm washing my hands about 30 times a day now. Do you think this has had an impact on contact dermatitis?

**Professor Nixon:** It certainly has. It was really quite weirdly exciting back in March when contact dermatitis became fashionable. I contributed to an article in "The Conversation". Lots of hand washing is an important cause of irritant contact dermatitis, but what I really want to emphasize is how good hand sanitizers are. Sometimes people are worried that if hand sanitizers as sting as they do on paper cuts that they shouldn't be using them.

We know that hand sanitizers are really effective in helping us decrease transmission of microbes. It's really important that we hand sanitize frequently and often. Certainly, hand washing is a cause of irritant contact dermatitis. It's important that people as much as possible wash with substitutes, but most importantly, moisturize their skin, particularly at night to restore that barrier damage from all the washing and sanitizing that's happened during the day.

**Dr. Mumford:** That concludes our touching episode on allergic contact dermatitis. Get it? "Touching," "contact dermatitis.", guys. I can't let an episode finish without at least one lame joke.

**Associate Professor Chong:** I would like to thank Professor Rosemary Nixon for your time and for sharing your expertise with us.

**Professor Nixon:** Pleasure.

**Dr. Mumford:** We would also like to thank Jo Coughlin and Peter Monaghan of the Skin Health Institute.

**Associate Professor Chong:** We hope you've enjoyed this episode of *Spot Diagnosis*. Remember, these podcasts are not meant to replace medical advice. If you have a skin condition that requires attention, we strongly encourage you to see your medical practitioner.

**Dr. Mumford:** For listeners who want more information on this subject, a transcript of this episode and links to other resources can be found on our website [spotdiagnosis.org.au](http://spotdiagnosis.org.au).

**Associate Professor Chong:** Please share *Spot Diagnosis* with your friends and colleagues. Rate and review us. Let us know what you think. We would really appreciate your feedback and any suggestions.

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