

Report

Contact allergy due to gloves a growing problem

TEXT: BEN ADRIAANSE

For a dental professional, wearing gloves during a treatment is as natural as wearing sunscreen to the beach or wearing a safety belt in a car. But do we consider the type and brand of gloves that we use carefully enough? With a market share of approximately 60 %, the nitrile glove is the most popular in dental care. Until recently, the quality and reliability of the characteristic blue, white or yellow substance was rarely questioned. Unfairly, if recent figures and studies are examined. Dental Tribune has taken up the gauntlet and immersed itself in a world of chemicals, red rash and misleading marketing phrases. 'You can develop a contact allergy from one day to the next.'

In the 1980s, the use of gloves became common in dentistry, with the increase in contamination with HIV/AIDS and hepatitis forming the most important reason. Back then, 100 % of the gloves were produced using natural rubber latex (NRL). The dangers associated with the lack of knowledge surrounding the production of NRL only became apparent in the 1990s. An alarming number of care providers suffered allergic reactions. These were sometimes cases of local contact allergy, but particularly the cases of the much more dangerous so-called type I reactions were noted, with symptoms such as teary eyes and asthma attacks and even anaphylactic shock. In hindsight these problems were not so surprising: nowadays we know that NRL contains more than two hundred proteins, with fourteen classified as allergenic by the WHO.

The epidemic of latex allergies and the subsequent new, more stringent European standards for latex gloves for medical use resulted in manufacturers making efforts to create a better supply of medical gloves in the 1990s. The production lines for latex gloves were extended, they were chlorinated and better raw materials were used. In addition, the synthetic alternatives nitrile and vinyl emerged. Medical professionals gradually switched to these alternatives and the image of latex as a raw material for gloves has remained tarnished since then.

Contact allergy (type IV) is usually characterised by a rash around the area of use: dry skin, itching, red patches, blisters, etc. According to Prof. An Goossens – an expert in contact allergy – contact eczema caused by gloves occurs mainly on the back of the hand, because the skin is thinnest in this area.

>Continues on page 14

Contact allergy by gloves a growing problem 'The risks can be a threat to your career'

> *continued from page 1*

LATEX ALLERGY

Michiel Paping – director of Research & Development Company Budev BV – regrets the misunderstanding surrounding latex allergy. Since 2010, Paping has been a member of the standards committee of the Netherlands Standardisation Institute (NEN) concerned with medical gloves. He explains that a distinction must be made between type I and type IV reactions.

'Type I is an immediate reaction to the allergens in the natural product, type IV is a delayed reaction to the chemicals used in the production process. If a latex allergy – or better yet, a rubber allergy – is mentioned nowadays, this is usually a type IV allergy. New type I cases are very rare due to the improved quality, production processes and standards. However, you can also develop a type IV reaction with nitrile or vinyl. In fact, I think that synthetic rubbers nowadays cause more contact allergies than NRL. The relevant point is the chemicals added during the production process.'

Prof. An Goossens, employed by the UZKU Leuven and an expert in the field of contact allergy, confirms this. 'It is not the raw, unprocessed rubber that causes type IV allergic contact eczema, but the excipients added during the manufacturing process, such as vulcanisation accelerators, plasticizers, fillers, antioxidants and colourants. Excipients are present in both natural and synthetic rubber gloves.'



Figure 1. Typical case of type IV contact allergy in a young nurse. The allergy occurred after wearing latex gloves, but became worse when she was offered a synthetic alternative. The woman has since had to stop working as a nurse and is now an administrative employee in the same department.

The nitrile glove soon became the most commonly used glove, despite the markedly reduced comfort compared to latex. 'Latex moulds itself completely to the body, stretches and feels like a second skin. Nitrile feels more like a plastic material in comparison,' according to Paping. Various studies confirm that latex scores higher on comfort and elasticity than nitrile. The cheap alternative vinyl scores even lower on

these points and is not really suitable for dentistry. In addition, Goossens is of the opinion that plastic gloves are permeable to more chemicals. Considering the sales figures, healthcare professionals appear to accept these disadvantages and were not sufficiently aware of the consequences of their choices. The sales of latex gloves for dentistry slumped in favour of nitrile and to a lesser extent vinyl. The discussion about latex allergy was silenced and for a while it seemed that there were very few problems.

THINNER AND CHEAPER

A number of crucial changes were set in motion a few years ago. The growing economies in emerging nations and the Swine Flu pandemic resulted in an increased demand for medical gloves and the production was increased considerably. However, the recession and the limited consequences of the Swine Flu resulted in overcapacity. This resulted in a drop in prices and manufacturers looked for opportunities to save on costs. This resulted in 2010 in the introduction of a lighter nitrile glove, usually called 'soft' nitrile.

Although the weight of nitrile gloves typically used to be over 5 grams, this decreased to 2.5 – 3.5 grams with soft nitrile. Simultaneously, the production lines were shortened and the so-called vulcanisation was performed at lower temperatures to save on energy costs. The dripping phase was also shortened or omitted.



Figure 2. One of the most popular nitrile gloves currently used in dental care. The yellow patches are the chemical residues exuded with intensive wearing of the gloves.

Traders are full of praise about the new generation of nitrile gloves that are 'more comfortable to wear' due to the thinner material. Sceptics have raised questions about this. 'Producing thinner gloves and thereby being able to fit more gloves in a shipment saves on costs for raw materials and transport. However, the production of such a thin product and vulcanisation at lower temperatures inevitably requires extra and new chemicals,' notes Paping. 'Furthermore, it is unavoidable that thinner gloves will score worse on strength and permeability.'

In order to test his hypothesis, Budev tested several frequently sold gloves. Ominous yellow patches were visible after use in the laboratory (see figure 2). 'Remember that the dentist places this in the patient's mouth,' warns Paping.

Contact of the skin with acrylates – often contained in bonding material – can be harmful to a person's health. Tests performed by Budev on their own Cleantexx – MPXX gloves revealed significantly less penetration of – among others – acrylate than with the new generation nitrile gloves. This whilst nitrile was originally praised

because it was so good at protecting the hands against chemicals. The thinner product negates this benefit.

Another point on which the thicker nitrile glove used to score higher is the behaviour of impression material on contact with the glove. Various manufacturers advise the use of nitrile gloves, because latex negatively affects the hardening process. Research by Budev has pointed out that the benefits of most nitrile gloves no longer apply due to the addition of extra chemicals and some latex gloves now even perform better when it comes to hardening.

Back to the 'old' nitrile gloves then? Apparently it's not that simple. 'As far as I know, the thicker and better variants are only produced sporadically and for very specific applications,' says Paping. 'The nitrile fans will have to make do with the thinner variant.'

The conclusions by Budev are supported by recent figures. 'Over the last few years we have noted a remarkable increase in contact allergy for rubber additives, also due to nitrile gloves', according to Prof. An Goossens. However, she cannot state with certainty the exact cause of the increase in contact allergy. 'This is possibly caused by a higher concentration of added chemicals, or by the presence of antimicrobial agents that cause skin irritation due to occlusion of the glove. Allergenic chemicals can penetrate the skin more easily as a result, allowing sensitisation to occur.'

Paping has also seen an increase in allergic reactions in daily practice. 'I recently gave a presentation to various assortment coordinators, who advise the large hospitals. When I told them about the developments surrounding nitrile gloves, the reaction was often: 'Oh, so THAT explains why we have seen so many people with a red rash over the past few years.' Recently, we have seen that the professional body is becoming concerned, partly due to the alarming figures. Despite this, I am concerned that the average dentist is not aware of this matter.'

The report *Occupational illness in figures* from 2011 shows that the number of cases of 'real' latex allergy decreased from 31 in 2000 to 4 in 2010. The same report stated that – in addition to new contact allergies – latex-free gloves exhibit a two-fold higher leak percentage (21.6 %). The conclusion is that 'non-latex gloves do not form a panacea for the skin.' On the other hand, nitrosamines in latex gloves are considered a possible health risk. Some of these gloves are however produced to be nitrosamine-free.

THE RESURRECTION OF LATEX

Meanwhile the latex glove is evolving and the proteins that can cause a latex allergy have been virtually eradicated from most brands. The concentrations are generally so low that a type I latex allergy is virtually impossible, as evidenced by a recent Finnish study (Palosuo et al., 2011) entitled *Latex medical gloves: Time for a reappraisal*. These findings, in combination with the user-friendly properties of latex and the costs that are no higher than nitrile, make the switch to latex a seemingly attractive prospect.

However, Goossens is reticent about advising a step in this direction. 'It is currently not possible to make definite statements about gloves of natural rubber latex from which the proteins have been removed, as there is not enough experience with this product,' she said. After all, it took several years for the allergies to latex and nitrile to surface too. Time will tell whether the new generation of latex gloves are actually superior, but the initial signs are good. The results of a study by the Erasmus University into the quality of the various types of latex and nitrile gloves will be published in November 2012.

AWARENESS

How should the health care professional make a decision? Goossens emphasises the importance of neutral information. ‘This could be provided via the professional associations.’ In addition, she advises the use of no-touch techniques as far as possible, such as applying impression material with a gun.

A change in the way of thinking is required according to Michiel Paping. ‘During training, the nitrile glove is presented as “the” glove of choice. When healthcare professionals start working in practice, you see that they use the same glove out of habit. What you often see is that an office manager or departmental assistant is given a budget for ordering gloves. He or she then looks for the cheapest product on the market, because well they are only gloves. As a result, cheap gloves of unknown origin are sometimes used in dental care. Believe me there are a lot of inferior products on the market.’

Why use nitrile instead of latex?

Latex gloves are definitely not bad, but why would you choose a possible latex allergy or the risk of contracting a virus? Studies have demonstrated that nitrile is a lot stronger and more reliable, which is why it is used in hospitals.

However, until recently, this difference in quality was also noticeable in price, until we entered this market.

The options that nitrile offers over latex and vinyl are endless, to put it mildly. What about the AIDS virus? As it has been demonstrated that nitrile is non-permeable to viruses, how long will it take before we see the first condoms made of nitrile?

Please visit our [comparison web page](#) for more comparisons to latex and vinyl.

Figure 3. Example of outdated marketing information about nitrile. Nitrile gloves nowadays cause at least as many allergies as latex gloves, have become less strong and score lower on permeability.

What about quality mark such as the CE labels that are supposed to guarantee the reliability of products? Paping: ‘You are allowed to sell gloves in Europe if they have a CE label. However, in the case of medical examination gloves, this quality mark can be awarded based on self-assessment. Of course you can have your doubts about this process.’

The advice from independent institutions is also not necessarily reliable, according to Paping. The National Centre for Hygiene and Safety (LCHV) – part of the RIVM – recommends the use of nitrile gloves. This advice is not included in any European directives. ‘When I confronted them about the fact that their information is not substantiated adequately, the LCHV referred to the CE label on nitrile gloves. Considering what I just mentioned about the creation of this quality mark, it is dubious that an organisation such as the LCHV bases its advice on this.’

It is best to consult test results yourself and ask the supplier questions. Paping: ‘Do not let them pull the wool over your eyes. Last year there was an article in *de Telegraaf* about “latex as a new pathogen”. This article claimed that three hundred thousand Dutch people have a latex allergy and that this number is growing rapidly due to the massive influx of this cheap type of rubber in hospitals. It is *nitrile* that is undergoing a massive influx and these Dutch people are suffering from an allergy to rubber additives.’

'There are a lot of inferior products on the market'

This can also be caused by synthetic rubber. Unfortunately, articles like these make an impression on healthcare professionals.' The same applies to outdated texts that can be found on all sorts of web pages (see figure 3). 'What you are seeing already, is that suppliers of nitrile gloves are removing terms such as "hypo-allergenic" and "worry-free" from their websites. Liability may form an issue.'

What would the ideal glove actually look like? Goossens: 'It is important to keep permeability as low as possible for products that one comes into contact with, such as acrylates and methacrylates. The glove should also be flexible and remain flexible and cause as little sensitisation as possible.' Paping envisions a glove that combines the comfort of latex with the absence of allergens and that is also powder-free. 'Powder has consequences for the healing process of wounds and can be a transmitter of allergens via the skin or airways.'

GOVERNMENT

What could the government do to combat the health risks of contact allergy? 'It is important that stringent checks are performed at the border,' according to Paping. 'In the USA, containers are opened to check whether the products meet the standards and their own specifications. This does not happen in Europe. There is room for improvement. In addition, new or improved standards need to be implemented to replace – for example – the CE quality mark, so that manufacturers are forced to make better products. The government should also ensure that good information is provided to the end user. With an annual global use of more than 150 billion pieces, the medical glove is something that requires serious attention.'

'The health insurance companies currently do not play a role. They could inform hospitals that the recession does not give them permission to order from obscure manufacturers. They do not have to reimburse everything without question and are allowed to demand certain standards. Also do not forget the role of the intermediaries. They also have a responsibility to inform their customers about what they are purchasing.'

ITCHING AND RED PATCHES

Should a healthcare professional who develops an itch on his hand not simply put up with it and pull on the glove again? 'That is the worst advice that you can give in this case,' says Paping adamantly. 'Once you have it, you can never get rid of it. I once spoke to an ambulance medical technician who developed a rash whilst working. Eventually he was unable to wear gloves and he was transferred to a different department. The next problem presented itself there, as he was also required to wear gloves here. You cannot underestimate the consequences of a contact allergy. It is a condition that can threaten your career. And you can develop it from one day to the next.'

Respond to this article?

Join the discussion on www.dental-tribune.nl or send an e-mail to redactie@dental-tribune.nl.