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Atopic dermatitis: professional orientation

Atopic dermatitis is often exacerbated by the working environment. In order to reduce the risk of allergy, young people must receive better medical guidance when they choose a career. This is all the more relevant for young atopic patients.

Key words: atopic dermatitis, work-related skin disease, occupational medicine, professional orientation, career guidance

Atopy is a very common condition, although it is difficult to precisely assess its incidence, particularly as regards atopic dermatitis, for which diagnostic criteria are mainly clinical criteria. These data should however be improving as consensus assessment criteria were adopted in the 1990s [1, 2].
Thus the incidence of atopic dermatitis (AD) in the general population is reported to range from 10 to 24% (15 to 25% in children and 10 to 15% in adults in Western countries). This disease has become a real public health problem as its prevalence is reported to have doubled over the past 3 decades to now reach a plateau of around 20% in industrialised countries. This plateau probably reflects the impact of both environmental and genetic factors [3, 4]. The prevalence of AD in the working population is difficult to assess but it seems to be accurately reflecting the numbers in the general population as it ranges from 15 to 25% of the workforce.
The clinical aspect of AD, as well as its evolution – for instance outbreaks interspersed with periods of remission – is extremely variable. Thus, for some patients the disease clears at puberty whereas for others it will become a permanent and lifelong disease [5]. Such an evolution is probably regulated by genetic and environmental factors, either domestic or occupational.
Meding *et al* particularly focused on work-related skin diseases reported in Sweden and found AD in 40% of the 16-24 year olds and in 17% of older employees, with a mean of 108 days of sickness absence in this population [6].
Thus many factors in the working environment will have an influence on AD, either making it worse or contributing to its persistence. This can particularly be accounted for by the impairment of the skin barrier function in workers – thus enhancing the irritant powers of physical or chemical agents – as well as by dysregulation of the immune response. Both phenomena facilitate transepithelial penetration of haptens and allergens, as well as breaking of the immunological tolerance to these molecules. Finally, individual psychogenic factors such as occupational stress are involved in the self-sustaining cutaneous inflammatory response by producing neuropeptides.
All these various aspects confirm the key role of the occupational physician in assessing medical fitness to work but also the role of the patient's general practitioner and dermatologist in providing vocational guidance when a young atopic patient chooses a career.

Occupational atopic dermatitis: epidemiological data

Various epidemiological studies have assessed the incidence of atopy in the occurrence of work-related skin diseases: thus 15 to 25% of workers are considered to be atopic but diagnostic criteria are not always precise and may vary. Similarly, the prevalence of contact dermatitis in AD ranges from 15% to 35% among authors. Besides, AD is considered as the main risk factor for hand eczema as it is reported that a history of AD triples the risk of developing hand eczema [7]. Subjects with atopic eczema are reported to develop a more severe form of eczema than subjects with respiratory atopy or non-atopic subjects [8]. It is however essential to note that 39% of workers with a history of AD did not develop eczema.
Let us now mention a few epidemiological studies on patients with eczema considered as occupational eczema. Malkonen confirms that AD is a risk factor for the continuation of occupational hand eczema (OR = 2.69) [9]. Similarly, in a case-control study, Nyren concludes that AD has a major impact on the career paths of workers, both in terms of sick leave and of professional reorientation [10].
Cvetkovski points out that after one-year follow-up, workers with AD have a 1.5 times higher risk of aggravated or persistent occupational dermatitis [11].
Besides, many authors have assessed the impact of AD depending on the job or occupational sector:

– In **female nursing students**, Smith reports that the prevalence of atopic dermatitis rose from 10.8% among first-year students to 27.4% among final-year students [12]. In 2009, Skudlik found a prevalence of 18% [13] and Ibler reported a prevalence of 21% in 2012 [14].
– In 1995, Uter particularly focused on 859 **hairdressing apprentices** assessed over an 8-week working period in 1993. 38.2% of them had skin issues, mainly irritant skin conditions [15]. In 2011, Lysdal, confirmed that there was indeed a risk of occupational eczema among hairdressers with a history of atopy (OR = 4.25). The prevalence of hand eczema was found to be significantly higher among ex-hairdressers (48.4%) than among current hairdressers and hand eczema was reported to be the main reason for career change. In addition, the risk of leaving the trade increased

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with the severity of hand eczema and the presence of a history of AD [16].
– In the **car industry**, Funke analysed the data from 2054 recruitment files and 1196 medical examinations after a year in the job. He found hand eczema in 6.7% of patients, irritation in 5% and A.D in 6.7%. It should be noted that 45.5% of apprentices with hand eczema were reported to use a protective cream [17].
– Susitaval particularly focused on the prevalence of hand skin conditions in 10,847 **farm workers** [18]. In this population, the prevalence of skin diseases was 16.2% for men and 19.8% for women and among them 41% of men and 44% of women had a history of atopy.
– In the **research sector**, Botham found allergy to laboratory animals in 10% of laboratory workers during the first year of employment [19]. This incidence was 38% in 1980, thus underlining the effectiveness of prevention policies. However, the authors reached the conclusion that it is impossible to predict whether a person with an individual risk factor such as atopy will be unfit for a job involving animals.
– Lastly, in 2013 Frimat confirmed the importance of work-related skin diseases in the **construction sector**. He found a prevalence of 12.7% for hand skin diseases across all professions, although roofers and masons were even more affected [20]. However, the author established a connection between a history of AD as well as with the time spent in the job. Besides, though the risk of chromium sensitisation seemed to be decreasing in this sector, it was noted that epoxy resins were being increasingly incriminated.

Clinical aspect - aggravating factors

In patients with AD, the barrier function may be impaired and present abnormalities such as xerosis, a frequent condition which can be made worse by high humidity, warm conditions and also confinement. Similarly, wool, synthetic textiles, hot water, soaps, detergents and swimming pool water are poorly tolerated. It should be noted that scratching and xerosis make it easier for environmental allergens to penetrate the skin.
Hand eczema in workers often follows a chronic course with hands looking dry, lichenified and cracked. The lesions can sometimes only take the form of pulpitis but, when the disease flares up, they can take the form of pruritic vesicles. If the disease progresses over a long period of time, onychodystrophy can also occur.
Thus, many factors can have an influence of the evolution of AD, they can be summed up as follows:

– **Physical factors:**
  • heat and cold, humidity and dryness, friction...
  • dust,
– **Chemical factors:**
  • non-specific: cleaning agents, solvents,
  • specific: cements, hair cosmetics...
– **Individual factors:** stress, emotions...

The development of hand eczema is always multifactorial. Thus, an atopic patient can have hand eczema with no history of exposure to a "real" irritant. In this case, it is often difficult to tell irritant dermatitis in an atopic patient from allergic eczema in a worker with a history of atopy.
Thus contact dermatitis can sometimes evolve on its own in atopic patients and become permanent, despite allergen avoidance. The data in the literature have, however, not made it possible to formally prove a significant increase in the incidence of allergic contact eczema in workers with AD, except possibly for nickel. Nonetheless, impairment of the skin barrier and the dysregulation of the immune response, which are typical of AD, contribute to making these patients a group with a higher risk of contact sensitisation.
Contact eczema and atopic eczema must be considered as inflammatory skin diseases due to loss of tolerance to environmental antigens. The role of airborne allergens in the development of atopic dermatitis now seems to be established, as such molecules can penetrate the skin when the barrier function is disrupted. Moreover, it is necessary to consider the particular case of protein dermatitis (latex, food...) which may occur more frequently in atopic patients.

Influence on career choice and fitness for work

Thus, for the occupational physician it is essential to look for a history of atopy, this is all the truer in the case of professions with a higher risk of work-related skin diseases. Let us mention the following sectors: the building sector, the hairdressing industry, hospitals, mechanics (oils...), agriculture, cleaning (detergents), hotels and restaurants... Indeed, it is difficult for atopic patients to cope with some physical and chemical conditions of the working environment. Thus, warm and humid conditions can increase the clinical signs of eczema, dry cold weather exacerbates dry skin, while dry and warm conditions cause excoriations. [21]. In air-conditioned offices and in workshops with dry conditions, in the air transportation sector and in the textile industry for instance, the skin becomes more sensitive to aggressions from paper, fabric or plastic particles. Poor maintenance of the ventilation system can also potentially exacerbate these symptoms.
Among the occupational activities that are most likely to exacerbate eczema, let us mention:

– The hairdressing industry
– Medical and paramedical care
– Cleaning (detergents, strippers)
– Building related professions (cement, form release oils, solvents, resins...)
– Food handling (cooks, caterers, canning industry)
– Mechanical work (cutting fluids, solvents...)
– Agricultural and forestry activities

The main aggravating factors that the occupational physician, in cooperation with the dermatologist, will look for are: the persistence of AD throughout childhood, the persistence of eczema into adulthood, as well as dry skin. As for severe AD during childhood, it is considered as a poor prognosis factor.
However, respiratory allergy with no skin atopy is not an aggravating factor for eczema, as opposed to the coexistence of respiratory allergy and dry skin. In a cohort study in 2010 (ISAAC II), Peters pointed out that AD persisted in 47.6% of adolescents with AD symptoms at baseline [22].

The risk factors for the development of AD are the combination of genetic factors, early allergen sensitisation and risky occupation [23].
AD must lead to increased vigilance against any irritants and allergens. Thus a worker with AD should not be hired to a position with "skin hazards" and industrial hygiene measures and prevention measures should be implemented.
Finally, though several studies have shown that atopic patients do not develop contact eczema more than non-atopics, it must be pointed out that tests find a higher incidence of sensitisation to balsam of Peru, fragrances and nickel than in non-atopic individuals.
However, pre-employment screening should not be developed, as the aim of the French occupational health process is employability and not selection.
Good knowledge of the job, of the products handled and tools used, of the movements made and of prevention measures must enable the occupational physician to assess employability/to confirm fitness for work. It is, however, important to be able to advise young patients with AD to choose another career and, unfortunately, when necessary, to issue a certificate of unfitness for work after consulting a specialist, should the risks be too high [24].
Thus, providing parents and children with early information, effective advice during the pre-recruitment medical examination (and not a few years later after claiming that the symptoms may have subsided) or even effective prevention should help to prevent "human disasters" due to sudden unfitness for work/unemployability, career guidance resulting in a deadlock and also impossible rehabilitation.

Compensation and redeployment

In some patients, exacerbation of AD only appears several years after they were hired. In such cases, the occupational physician will have to implement the best possible prevention measures and even, if necessary, recommend occupational redeployment and sometimes possible compensation.
However, it has been established that what could be called a "work-related" skin disease in an atopic worker can cause problems as regards compensation. It is indeed quite legitimate to wonder what the part of atopy is in the occurrence of the disease or even to look for domestic and family factors or for potentially interfering allergens.
In most cases, exacerbation of the AD is caused by work-related actions and products. However, if the dermatitis is considered an occupational disease, it will then be compensated as such. Whether the disease should lead to compensation or not, redeployment or career reorientation will have to be implemented and the patient could be spared the potential cost of the vocational training if the disease is recognised as an occupational disease.
When occupational redeployment occurs, it is often due to irritation (from products, humidity. . .). It is sometimes difficult to find another position for the worker, who should receive detailed information regarding prevention measures (gloves, skin hygiene and skin care practices. . .)

Appropriate management

Obviously the appropriate management of AD may vary and depend on whether the patient is a teenager wondering about which career to choose, a worker with transient skin lesions or even a qualified employee in a high-risk job. Each of these cases is indeed singular and it is therefore rather difficult to draw general rules as other factors can come into play (motivation, fitness for work/employability, environment. . .).
It is thus necessary for the occupational physician to have accurate knowledge of the movements and gestures of the workers, of the products used and of the worker's personal history of atopy. As a general rule, atopic workers should not be exposed to heat, humidity and dust. However, a family history of atopy in a worker who has never had any skin disease, as well as a history of atopy in childhood with no clinical signs at adult age – even if the worker has dry skin – should not result in a decision of unfitness for work. It is however essential for young workers with atopic lesions to receive professional guidance.
Lastly, only in exceptional cases should an "atopic" employee who has been in the same job for years be found unfit for work and any ensuing redeployment offer will have to be thoroughly considered in close collaboration with the company. Thus, in this context, the occupational physician plays a central and essential role, although this role can sometimes be difficult in today's socio-economic context.
This only re-affirms that occupational physicians and dermatologists should collaborate, particularly when there are medico-legal issues following the diagnosis of work-related skin disease [21-25].
What has been said so far can be summed up as follows, using risk assessments algorithms:

	Persistent AD	History of AD+ pruritic dry skin	History of AD during childhood	Atopy with no history of skin involvement
High risk job				
Medium risk job				
Low risk job				

Career reorientation
Information + Strict prevention measures + Surveillance
Similar risk among atopics/non-atopics

Conclusion

All these aspects, whether they are work-related or related to the individual, underline the fact that both therapeutic and preventive actions carried out by dermatologists and occupational physicians are essential.

As has been mentioned earlier, fitness or unfitness for work certificates – both major medico-legal acts in the field of occupational medicine – will have to be issued after a thorough medical examination, the opinion of a specialist and, obviously, after studying the workplace. This only confirms the major role of **multidisciplinary consultations in occupational dermatology** which allow for better career guidance and effective follow-up of workers with a view to keeping workers in the workforce.
Ultimately, physicians must convince atopic patients to follow strict – and sometimes restrictive – prevention measures on a daily basis, failing which an allergy might occur and cause unfitness for work and lead to professional reorientation. ■

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