



## ALLERGIC CONTACT DERMATITIS IN BULGARIA – COMPARISON BETWEEN 1987 AND 2017

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### ABSTRACT:

In our study, we are trying to show how the data on allergic contact dermatitis has changed over the years in Bulgaria.

**Purpose:** The socio-economic changes had an impact on the medical data since the fall of the Berlin Wall. We investigated how this changes reflected especially on contact allergy.

**Material/Methods:** In order to achieve our goal, we compared the Bulgarian results from epicutaneous testing in 1987 and 2017.

**Results:** Allergens to which the greatest number of patients were sensitized in 1987 in the cities of Sofia and Plovdiv were Potassium dichromate, 4-isopropylamino diphenylamine, Formaldehyde, Nickel (II) sulfate, and P-aminodiphenylamine (PPD). In 2017 - for the same number of patients and in the same cities, top 5 allergens were Nickel (II)sulfate hexahydrate, Cobalt(II)chloride hexahydrate, Colophonium, Potassium dichromate, Myroxylon pereirae resin.

**Conclusions:** The most alarming are the data on how much sensitization to nickel increased in 2017 due to the continuous use of this metal. The positive reactions to potassium dichromate were more in 1987, whereas in 2017 due to the concentration adjustment for hexavalent chromium in cement, the number of cases with contact allergy to potassium dichromate was reduced.

These data show that until we succeed in regulation and prevention, we cannot hope to seriously reduce contact allergy cases.

**Keywords:** Frequency, contact dermatitis, prevalence

### INTRODUCTION:

Contact dermatitis is a skin inflammation process, which occurs at the site of contact with irritating or allergic substances. Contact dermatitis is divided into irritant and allergic types. Differential diagnosis between irritant contact dermatitis (ICD) and allergic contact dermatitis (ACD) is difficult. [1] ICD is due to cumulative or solitary exposure to an irritant followed by keratinocytes damage. [2] ACD is result from type IV delayed-type hypersensitivity. From clinical and histopathological point of view both types are indistinguishable. Epicutaneous testing is the most important standart method for diagnostic of ACD and its differentiation from ICD. [3, 4]

The frequency of contact allergy is constantly growing. New data show that the prevalence of ACD in the general population is 20.1% and in children and adolescents is 16.5 %. Top 5 allergens are Nickel, Fragrance mix, Cobalt, Myroxylon pereirae, and Potassium bichromate. [5] In contrast, in 1990 in the western part of Denmark, contact sensitivity to one or more haptens was found to be 15.9%. [6]

In the last 30 years our country went through many political economical and social changes. We are trying to show how the data on allergic sensitization has changed over the years in Bulgaria and to elucidate the top 5 contact allergens.

## MATERIALS AND METHODS:

We decided to look how the socio-economic changes after the fall of the Berlin Wall reflected on the medical data, and especially in the field of contact dermatitis. In order to achieve our goal, we compared the results of epicutaneous testing in 1987 and 2017. In 1987 each patient was tested with standard series for epicutaneous testing created by the Council for Mutual Economic Assistance (COMECON). These patch serie included 16 allergens and was in use in all Eastern European countries. In 2017 the patients were tested with European Baseline serie, containing 30 allergens.

Patch testing consists of attaching hypoallergenic chambers with the investigated allergens on the upper part of the patients back. Patients were instructed to carry the patch test for 48 hours with-

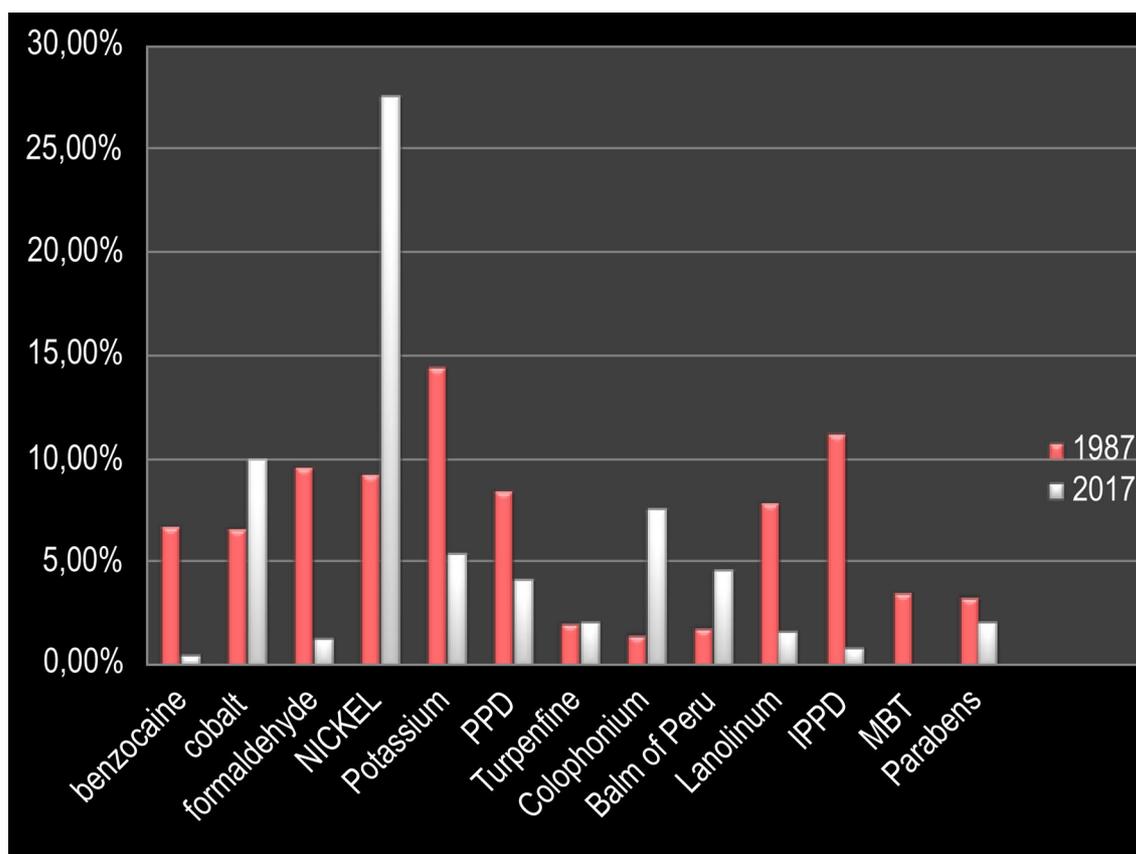
out removing it and to avoid physical stress and contact with water. The patch test was removed at 48 hours and the reactions were recorded at 48 and 72 hours respectively.

## RESULTS:

In 1989 an article was published in the Bulgarian Journal of Dermatology and Venereology, which exported data on contact allergic dermatitis in Sofia and Plovdiv. The authors summarized data from 240 patients tested in 1987. [7]

Evaluating the patch test series from 1987 and 2017, we saw that 13 of the allergens are the same, so we compared the data for them, taking the same sample of 240 patients, tested in Sofia and Plovdiv (Fig. 1).

**Fig. 1.** The graph shows the comparison of the incidence of contact-allergic reactions to these 13 allergens. In Red is the data from 1987, and in white - from 2017:



The top 5 allergens to which the largest number of patients developed contact sensitization in 1987 were: Potassium dichromate, 4-isopropylamino diphenylamine, Formaldehyde, Nickel (II) sulfate, and PPD. [7]

The top 5 allergens in 2017 were: Nickel(II)sulfate hexahydrate, Cobalt(II)chloride hexahydrate, Colophonium, Potassium dichromate, Myroxylon pereirae resin.

## DISCUSSION:

Our results showed how much allergy to nickel has increased in 2017. Nickel coin exposition, keys, metal buttons for clothes and buckles are the same in 1987 and 2017. However, today nickel allergy is changing. In recent years, nickel allergy has multiple faces. [8, 9, 10] First of all, there are many new devices that contain nickel - mobile phones, computers, tablets and these appliances are constantly in our hands. Another new source of nickel allergy is the use of metal implants by orthopedic specialists. Thus can be another reason for development of nickel systemic contact dermatitis.

Sensitization to potassium dichromate is also changing. In Bulgaria, as a member of EU, the concentration of hexavalent chromium in cement content is regulated. The cement should not contain more than 2 parts per million (ppm) hexavalent chromium. Unfortunately, many Bulgarians buy Turkish cement, which is cheaper, but contains hexavalent chromium far above the norms (Turkey is not an EU member). Thus, in Bulgaria, although the number of patients with an allergy to potassium dichromate has decreased, we still have many patients sensitized to this allergen.

The changes in the sensitization to paraphenylene diamine are very interesting. The typical localization in allergy to hair dyes are the eyelids and the border between the hairy and uncut front of the head. On the scalp itself there is often no change because the hair day is quickly taken

down to the hair shaft. Scalp rarely stains when dyed. [12, 13] Allergy to hair dyes increases due to new sources of contact allergy - hair extensions. [13] Because of them, there is a new localization - on the scalp itself, as they stick together there and the contact with paraphenylene diamine is much stronger. In these cases, allergens can also be the metal clips with which the extensions are attached to the scalp. The henna tattoos are also a new source of paraphenylene diamine allergy. They are made from a mixture consisting of henna, different oils and paraphenylene diamine. This is also visible in the very color - it is not orange like the nature henna - but black. All over the world there are similar allergic reactions to temporary henna tattoos due to paraphenylene diamine.

## CONCLUSIONS:

The frequency of contact allergy continues to grow. There is an exposure of new allergens to which we are exposed. The prevention in contact dermatitis is extremely important. In ten consecutive years the Bulgarian Dermatological Society and the Section for Dermatoallergology organize National campaigns devoted to the contact allergy prevention. During the campaigns we offer free patch test for the patients suffering from ACD. This year will be the 11th campaign, which will enable us to unify the data from all over the country and look at the peculiarities in Bulgaria.

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