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CASE REPORT

Thermographic Proof of "Flare Up Syndrome" in Patient with Allergy to Acrylic Materials

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Abstract

We report the case of a 23-years-old female dental medicine student with contact dermatitis on her hands caused by methacrylates. Forty-eight-hour closed patch testing showed positive reactions to Ethylene glycol dimethacrylate, 1,6-Hexanediol diacrylate, 1,4-Butanediol dimethacrylate, Drometrizole. These are identified as contact allergens. They can be found in the dental materials, but also in the nail polish. It is therefore easy to be exposed to methacrylate in daily life. We measured the skin reaction during the patch test, and noticed that the temperature of the affected skin changes. The highest value was registered when the patches were applied, and the lowest - one week after the treatment.

Keywords

Patch-test, Thermo-vision, Allergic contact dermatitis, Methacrylate, Professional allergens

Introduction

The allergic contact dermatitis (ACT) is the most frequent manifestation of immunotoxicity in humans [1]. The disease has a strong social and economic effect [2]. ACT is a the 4th type reaction by the classification of Coombs and Gell. The allergic reactions that we observed in patch-tests, can be measured by the temperature changes of the affected skin [3,4]. The method we applied to measure the patch test reactions, is also applicable for measurement of the intensity of the allergic reaction of the affected skin [5]. However, some studies show that the local lymph nodes are also involved in the reaction [6]. Initially we assumed that our patient`s symptoms are connected with the acrylic products contained in her gel nail polish. They can be found in different products like dental composites, nail polish, artificial nails, cosmetics, adhesives, prostheses, etc [7]. There is a similarity between dental and cosmetic products - they have the same kind of methacrylate [8]. In this paper we report a case of contact dermatitis caused by methacrylate contained in different kinds of source - dental materials and cosmetic products.

Case

We report a case of 23-years-old female, student of dental medicine, who developed dermatitis on her hands approximately one month ago, when she applied a nail gel polish in Cyprus - Clarite O.P.I. The gel nail polish is a multicomponent allergen which contains. In the past there were four times of exposure to gel nail polish, but the product have been different. When she was in Cyprus, she visited a dermatologist who put the diagnosis "Allergic contact dermatitis", and advised the patient to make a patch test. Her hands developed xerotic skin, erythema, papules and itching. When she returns back to Sofia, she starts working with dental materials, mainly with Spofadental - Duracryl™ Plus. The gel nail polish and the dental materials have some common allergens - Methyl methacrylate, Bisphenol A dimethacrylate, Ethylene glycol dimethacrylate, 1,6-Hexanediol diacrylate [8]. On Figure 1 and Figure 2 we see the affected skin of the palms.

In order to identify the dermatitis cause, we carried out a patch test (on the patient's back) for the most suspicious allergens by the Chemotechnique diagnostics - Dental Screening Series DS-1000, and allergens from the Bulgarian dental allergens produced in the National centre of infectious and parasitic diseases. For patches we use IQ Ultimate™. The patch test performance and

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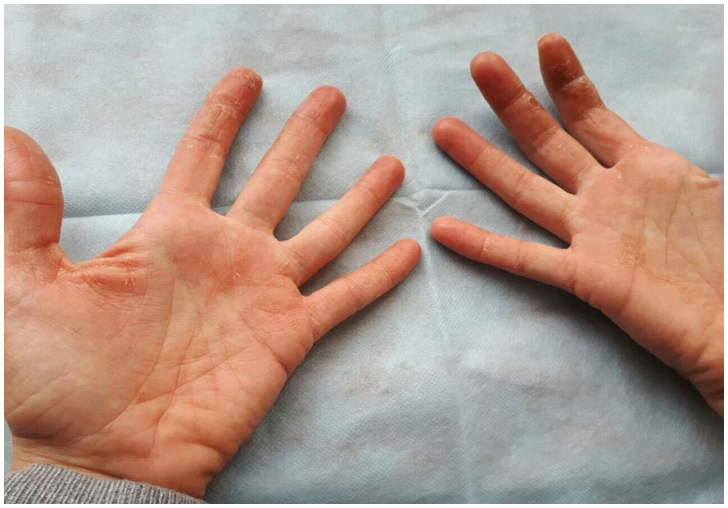

Figure 1: The palms affected by the allergic contact dermatitis.

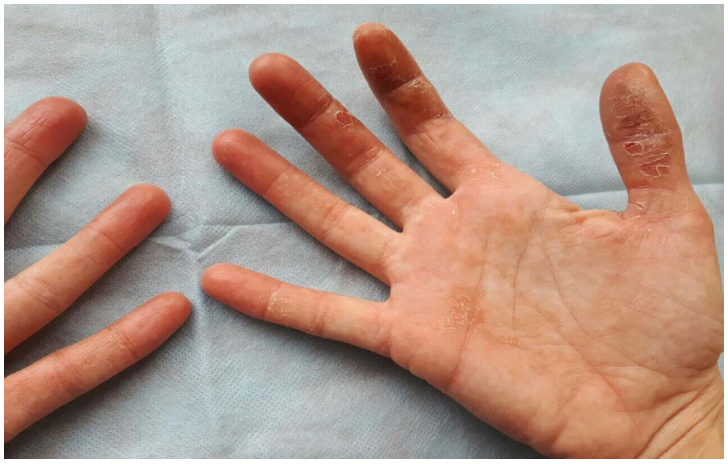

Figure 2: The palms affected by the allergic contact dermatitis.

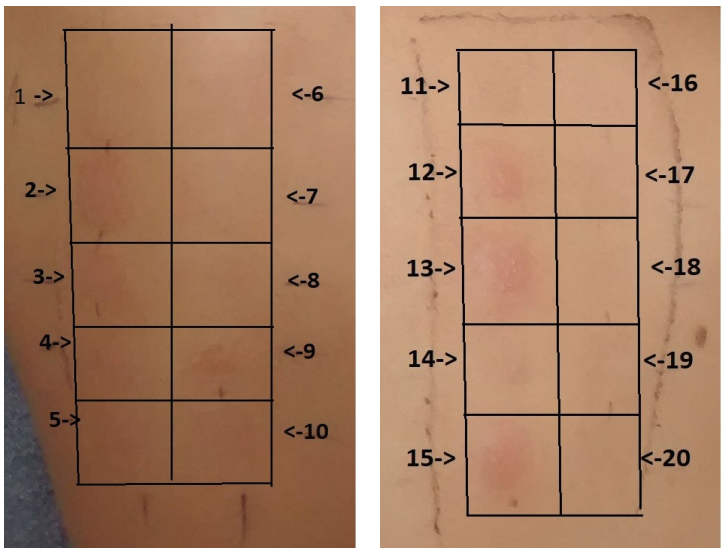

Figure 3: Pictures of the patient's back at the moment of patch test results checking.

the results assessment were based on the ICDRG (International Contact Dermatitis Research Group) criteria. The results are presented in Figure 3 in Table 1.

We have positive reactions for two of the common allergens: Ethylene glycol dimethacrylate and 1,6-Hexanediol diacrylate.

In order to assess the allergic inflammation status we measured the temperature of the affected areas three times: Before the patch test; on the day when we read the result; and one week later. These measurements were performed with FLIR T620 thermo-camera with resolution 0.06 degrees and software Flir Reporter

Table 1: Results from the Patch test.

No:	Allergen	Reaction	
1	Natrium lauryl sulfate 0.25% aq	-	Negative
2	Nickel (|) sulfate hexahydrate 5.0% pet	+	Positive
3	Cobalt (||) chloride hexahydrate 1.0% pet	+	Positive
4	Gold (|) sodium thiosulfate dihydrate 2.0% pet	-	Negative
5	Potasium dichromate 0.5% pet	-	Negative
6	Bisphenol A dimethacrylate 2.0% pet	-	Negative
7	Tetrahydrofurfuryl methacrylate 2.0% pet	-	Negative
8	Mercury 0.5% pet	-	Negative
9	Methyl methacrylate- 2.0% pet	-	Negative
10	Negative control (empty chamber)	-	Negative
11	2,2-bis(4-(2-Methacryl-oxyethoxy)phenyl)propane (BIS-EMA) 2.0% pet	-	Negative
12	Ethylene glycol dimethacrylate 2.0% pet	++	Positive
13	1,6-Hexanediol diacrylate 0.1% pet	+++	Positive
14	1,4-Butanediol dimethacrylate 2.0% pet	+	Positive
15	Eugenol 2.0% pet	+++	Positive
16	Colophonum 20% pet	-	Negative
17	Drometrizole 1.0% pet	+	Positive
18	Camphoroquinone (Bornanedione) 1% pet	-	Negative
19	Palladium (||) chloride 2.0% pet	-	Negative
20	Carvone 5.0% pet	-	Negative

Table 2: Maximal and average temperatures of the affected areas.

	Before the patch test	After the patch test	One week later
Max Temperature	35.8	36.4	34.6
Min Temperature	23	20.3	21.7
Image Max. Temperature	35.8	36.4	34.6
Ar1 Max. Temperature	32.1	35.6	28.5
Ar10 Max. Temperature	35.8	36.2	29.5
Ar2 Max. Temperature	32.9	35.6	28.4
Ar3 Max. Temperature	31.8	35.1	29
Ar4 Max. Temperature	31.5	35.4	28.4
Ar5 Max. Temperature	34	35.6	30
Ar6 Max. Temperature	33.7	36.2	29.3
Ar7 Max. Temperature	31.7	35.7	29.1
Ar8 Max. Temperature	32.3	35.6	29.9
Ar9 Max. Temperature	34	36	30
Ar1 Average Temperature	30.6	34.8	25.8
Ar10 Average Temperature	33.9	35.3	27.5
Ar2 Average Temperature	31.2	34	26
Ar3 Average Temperature	30.5	32.5	26.1
Ar4 Average Temperature	30.2	34.1	26
Ar5 Average Temperature	32.5	34.8	27.1
Ar6 Average Temperature	32.2	35.2	27.1
Ar7 Average Temperature	30.2	34.5	27.1
Ar8 Average Temperature	30.2	34.6	27.7
Ar9 Average Temperature	32.2	34.9	27.7

Professional software 2013. We accept for significant any temperature change for more than 0.4 degrees between first and last monitoring of identical areas of the skin. The thermovision is performed in a special room for this in the Faculty of dental medicine - Sofia. The temperature there is 22 ± 2 degrees, the humidity 40%, no movement of air with more of 1.0 meters/sec, distance between the camera and the patient from 0.3 to 2 meters, no thermal radiation open sources [9]. The temperatures we detected are summarized in Table 2. On Figure 4, Figure 5 and Figure 6 we show the thermos-vision pictures of the hands. Figure 7 and Figure 8 present a comparison between the temperatures of the different fingers and Figure 9 - the average temperatures of the three measurements.

About 8 hours after the patch application, the patient called to complain from strong itching on the place of the patch, and perioral rash. Later she visited our laboratory for patch reading, and by this time the rash had disappeared.

Treatment: The patient was informed the sources of

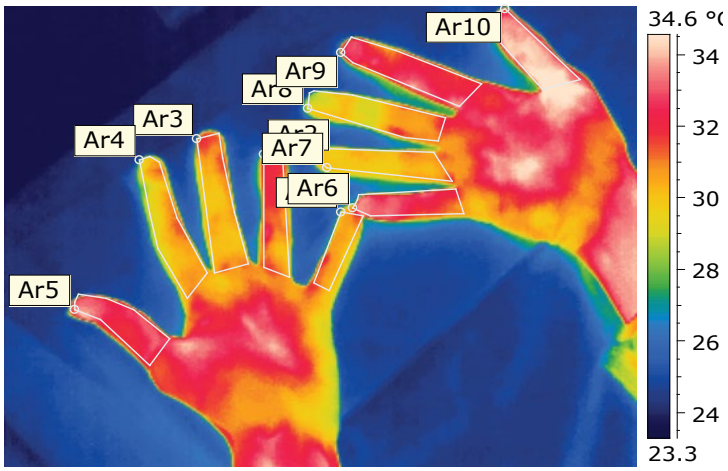

Figure 4: Thermo-vision picture of the hands before the patch test.

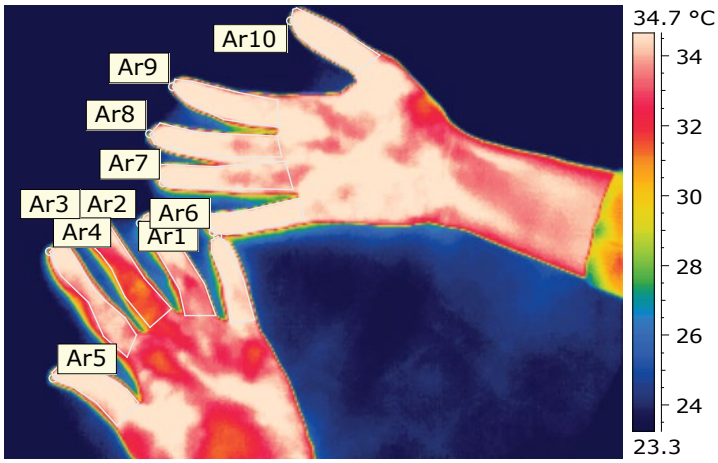

Figure 5: Thermo-vision picture of the hands in the day of the patch test reading.

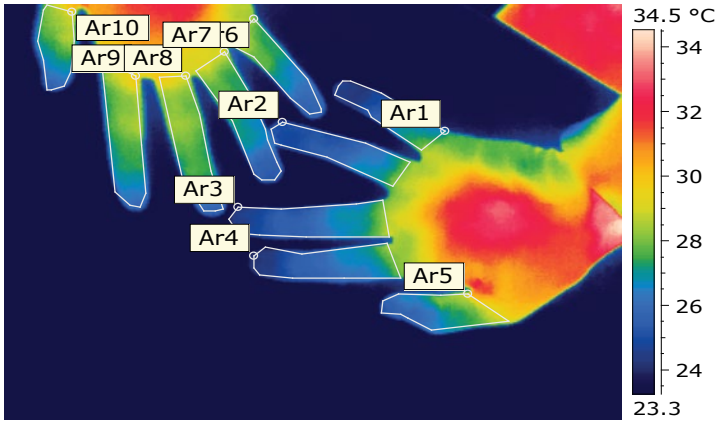

Figure 6: Thermo-vision picture one week after the beginning of the treatment.

allergens, and advised to stop any contact with them. The nail polish was removed carefully, and the contact with dental materials containing methacrylate was avoided. We prescribed a topical corticosteroid cream - Elocom - 0.1% and another cream containing urea - Linola® Urea 12% (Figure 10).

Discussion

The patch test makes contact between the skin and allergens. Our aim was to provoke an allergic reaction, that would indicate sensibilisation of the organism. The sensibilisation to acrylic monomers is often observed in dental personal, and our patient is working with dental materials during her education [10,11]. Besides, there are cases of contact dermatitis induced by the methacrylate contained in artificial nails [12]. We also have to consider the full range of responses observed during the patch test. This includes the possibility that the re-

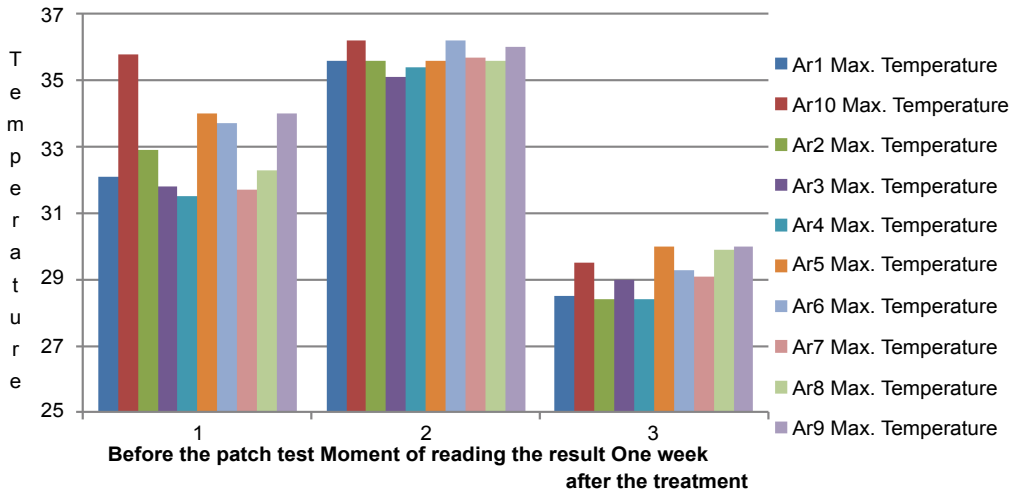

Figure 7: Maximal temperatures of the explored areas.

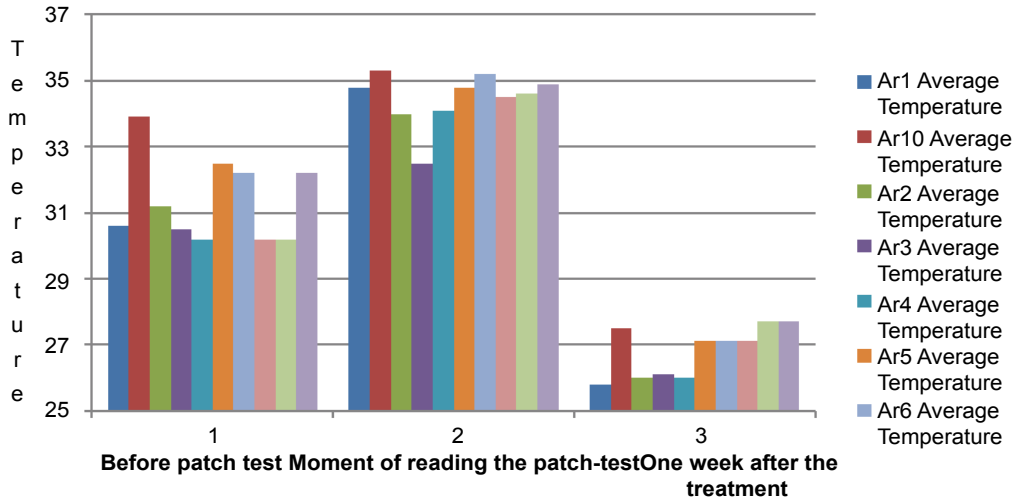

Figure 8: Average temperatures of the explored areas.

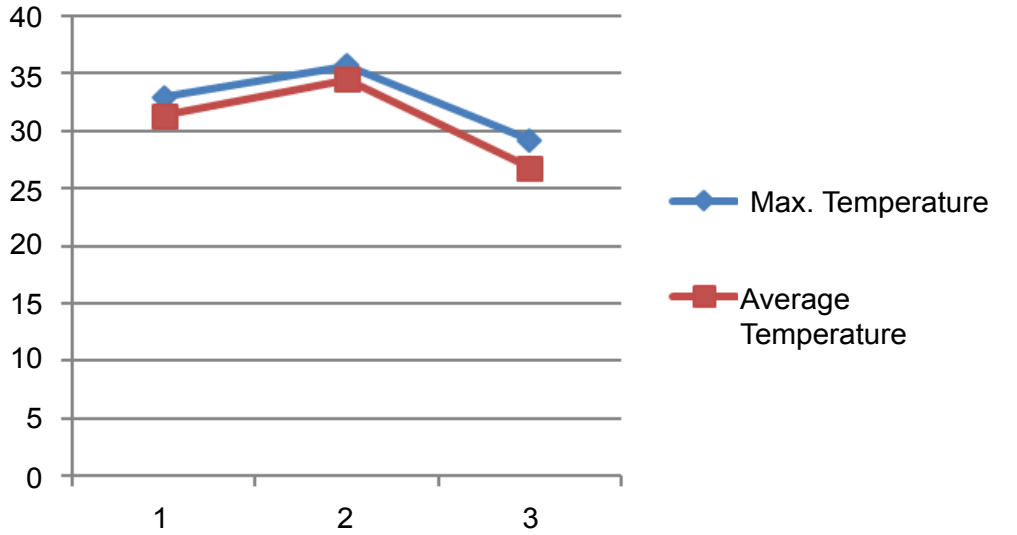

Figure 9: The change of the maximal and average temperature at the three moments of measurement.

sults could be a result of cross reactivity or more likely a broad increase in sensitivity to all allergens as a result of compromised skin barrier condition as is a well-recognised phenomenon in dental industry [13,14].

We presume that the process has a local character. However, the impact area and borders are subject of discussion. The allergic reactions are functions of the immune system, so we can expect the whole immune

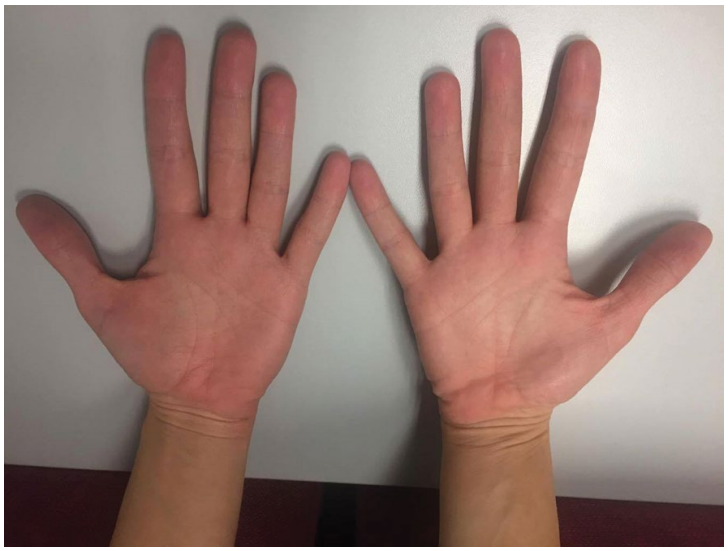

Figure 10: The palms of the patient one week after the last contact with the allergens.

system to be involved. This means that the test affects the whole organism. On the other hand, the reactions of this type is relevant to the local effects of the allergens in the place of contact. This is demonstrated by the observed skin changes.

However, we noticed increasing of the intensity of the main allergic disease - demonstrated by increase of hands temperature.

We analysed the thermovision photographs to estimate the intensity of the allergic inflammation. The temperature trend of the affected areas indicates how the disease develops. As a component of the inflammation, the rising of the temperature is a sign of exacerbation. This risk of exacerbation has to be considered every time when a patch test is performed.

References

1. Kimber I, Basketter DA, Gerberick, GF, Dearman RJ (2002) Allergic contact dermatitis. International Immunopharmacology 2: 201-211.
2. Uter W, Schnuch A, Geier J, Frosch PJ (1998) Epidemiology of contact dermatitis. The information network of departments of dermatology (IVDK) in Germany. Eur J Dermatol 8: 36-40.
3. Dencheva M, Lyapina M, Kisselova Yaneva A, Garov S, Hristova S, et al. (2014) Thermovision in dental allergology. Journal of IMAB 20: 558-562.
4. Laino Luigi, Di Carlo A (2010) Telethermography: An objective method for evaluating patch test reactions. Eur J Dermatol 20: 175-180.
5. DI Carlo A (1995) Thermography and the possibilities for its applications in clinical and experimental dermatology. Clin Dermatol 13: 329-336.
6. Kimber I, Hilton J, Botham PA (1990) Identification of contact allergens using the murine local lymph node assay: Comparisons with the Buehler occluded patch test in guinea pigs. J Appl Toxicol 10: 173-180.
7. (2018) Patch Test Products & Reference Manual. Chemotechnique Diagnostics.
8. Chonin AS (2017) Allergy to methacrylate's in dental medicine. Dissertation for assigning the educational and scientific title "Doctor". Faculty of Dental Medicine, Plovdiv.
9. Dencheva M, Balcheva M (2014) Dental Clinical Allergology for dental students. 157-158.
10. Aalto-Korte K, Alanko K, Kuuliala O, Jolanki R (2007) Methacrylate and acrylate allergy in dental personnel. Contact Dermatitis 57: 324-330.
11. Kiec-Swierczynska MK (1996) Occupational allergic contact dermatitis due to acrylates in Lodz. Contact Dermatitis 34: 419-422.
12. Marks James G, Bishop Marvin E, Willis William F (1979) Allergic contact dermatitis to sculptured nails. Arch Dermatol 115: 100.
13. Lazzarini R, Hafner MFS, Lopes ASA, Oliari CB (2017) Allergy to hypoallergenic nail polish: Does this exist? An Bras Dermatol 92: 421-422.
14. Douwes J, Slater T, Shanthakumar M, McLean D, Firestone RT, et al. (2018) Determinants of hand dermatitis, urticaria and loss of skin barrier function in professional cleaners in New Zealand. Int J Occup Environ Health 23: 1-10.