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Contact Dermatitis in Music Professionals Referred for Patch Testing: North American

Contact Dermatitis Group Data, 1996-2018

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Music professionals (MPs) are at risk for both allergic (ACD) and irritant contact dermatitis (ICD). Allergens include colophonium in rosin for strings¹ and exotic woods in wind instruments.^{2,3} Here, we summarize data on MPs patch tested by the North American Contact Dermatitis Group (NACDG), 1996-2018.

Methods

The Minneapolis VAMC Subcommittee on Human Studies approved this study. NACDG guidelines of patch testing are outlined elsewhere.⁴ Patients tested by the NACDG with occupations of musician/composer, music teacher, music store worker, or musical instrument/camera/watch repairer comprised the MP group. Demographics, allergens, reaction characteristics, clinical relevance, and source details were investigated using descriptive analyses.

Results

Of 53,707 patch tested patients, 59 (0.11%) met study criteria. About half were >40 years old (52.5%), female (54.2%) and/or atopic (history of asthma/atopic dermatitis/allergic rhinitis, 62.7%) (Table 1). Primary diagnoses included ACD (49.2%) and ICD (16.9%). Primary anatomic sites of dermatitis were most frequently face (33.9%) or hand (27.1%).

One-third of MPs (32.2%, n=19) had no positive patch test reactions. There were 103 total positive reactions (average: 2.5 reactions); 59.2% were currently relevant. Positive NACDG screening allergens included nickel (9.7%, n=10), neomycin (7.8%, n=8), bacitracin (6.8%, n=7), colophonium (5.8%, n=6), fragrance mix I (5.8%, n=6), and formaldehyde 1.0% aq (5.8%, n=6).

Twelve MPs (20.3%) had occupationally-related skin disease. Of these, 58.3% (n=7) had a primary diagnosis of ACD (musician/composers n=3, repairers n=3, music store supervisor n=1) and 41.7% (n=5) had a primary diagnosis of ICD (musician/composers n=2, repairers n=2, music store supervisor n=1). Occupationally-related allergens included epoxy (n=1), PCMX (4-Chloro-3,5-Xylenol) (n=1), colophony (n=1), and nickel (n=1); 3 supplemental allergens/substances (names not recorded) had sources of musical instruments (n=1), lip balm (n=1), and solvents/oils/lubricants (n=1). Identified sources of ICD included disinfectants, solvents/oils/lubricants, and musical instruments.

Discussion

Our prevalence of occupationally-related disease in MPs (20.3%, 12/59) is higher than the 8.9% (21/236) found in MPs by the IVDK (Information Network of Departments of Dermatology).³ Prevalence of occupational ACD was also higher in our patients (11.9%, 7/59 vs. 3.4%, 8/236³), however proportions with hand (27.1%, 16/59; 26.3%, 62/236³) and facial (33.9%, 20/59; 23.7%, 56/236³) dermatitis were similar.

The most common sensitizations in our study were to nickel, neomycin, bacitracin, colophonium and fragrance mix I; the IVDK study also reported frequent positive patch test reactions to nickel (9.3%, 20/216), fragrance mix I (7.0%, 15/214), and colophony (4.7%, 10/214).³ Our higher reaction prevalence to neomycin and bacitracin likely reflects greater over-the-counter availability in the US (neomycin and bacitracin) and Canada (bacitracin). Nickel

allergy from contact with instruments has been reported including ACD from a metal piece on the lower bout of a viola.⁵ Nickel can also be present in instrument strings, body, keys, and mouthpieces.^{6,7} Colophonium (rosin) is used on string instruments to enhance friction forces between bow and string; allergy has been reported in string players.¹

Our study is limited by cross-sectional design, referral population and sample size.

In summary, North American MPs referred for patch testing had dermatitis of the face and/or hands. Occupationally-related skin disease was present in 20.3%. Occupationally-related allergens included epoxy, PCMX, colophonium, and nickel as well as supplemental allergens.

References

1. Vandebuerie, L., Aerts, C., & Goossens, A. (2014). Allergic contact dermatitis resulting from multiple colophonium-related allergen sources. *Contact Dermatitis*, 70(2), 117–119.
2. Gamboa, P. M., Sánchez, J., Seguro, A., Galán, C., García-Lirio, E., Seras, Y., & Jáuregui, I. (2019). Occupational contact dermatitis due to rosewood in a Basque wind instrument (txistu). *Contact Dermatitis*, 81(6), 450–451.
3. Kraft M, Schubert S, Geier J, Worm M; IVDK. Contact dermatitis and sensitization in professional musicians. *Contact Dermatitis*. 2019 May;80(5):273-278. Epub 2019 Jan 14. PMID: 30499108.
4. DeKoven, J. G., Warshaw, E. M., Belsito, D. V., Sasseville, D., Maibach, H. I., Taylor, J. S., Marks, J. G., Fowler, J. F., Mathias, C. G. T., DeLeo, V. A., Pratt, M. D., Zirwas, M. J., & Zug, K. A. (2017). North American Contact Dermatitis Group Patch Test Results 2013-2014. *Dermatitis*, 28(1), 33–46.
5. Jue, M. S., Kim, Y. S., & Ro, Y. S. (2010). Fiddler's neck accompanied by allergic contact dermatitis to nickel in a viola player. *Annals of Dermatology*, 22(1), 88–90.
6. Vine K, DeLeo V. Dermatologic manifestations of musicians: a case report and review of skin conditions in musicians. *Cutis*. 2011 Mar;87(3):117-21. PMID: 21488568.
7. Helm, Thomas N.; Taylor, James S.; Adams, Robert M.; Fisher, Alexander A.; Nethercott, James R. Skin Problems of Performing Artists, *American Journal of Contact Dermatitis*: March 1993 - Volume 4 - Issue 1 - p 27-32

Table 1: Characteristics of Music Professionals

Characteristics	No. (%) N = 59	
Male	27 (45.8)	
Skin condition related to occupation	12 (20.3)	
Atopy		
Hay fever	24 (40.7)	
Eczema	15 (25.4)	
Asthma	14 (23.7)	
Age, 40 > y	31 (52.5)	
Anatomic Site(s)[†]	Primary Site No. (%) N=59	Any of up to 3 Sites No. (%)* N=59
Face, total	20 (33.9)	29 (49.2)
Face, not otherwise specified	7 (11.9)	9 (15.3)
Lips	7 (11.9)	9 (15.3)
Eyelids	5 (8.5)	9 (15.3)
Nose	1 (1.7)	1 (1.7)
Ears	0 (0.0)	1 (1.7)
Hand	16 (27.1)	19 (32.2)
Scattered generalized	6 (10.2)	9 (15.3)
Foot	5 (8.5)	8 (13.6)
Trunk	3 (5.1)	4 (6.8)
Scalp	2 (3.4)	3 (5.1)
Anal/genital	2 (3.4)	2 (5.1)
Leg	2 (3.4)	3 (5.1)
Most exposed areas	1 (1.7)	1 (1.7)
Only under clothing	1 (1.7)	1 (1.7)
Arm	0 (0.0)	5 (8.5)
Neck	0 (0.0)	2 (3.4)
Other	0 (0.0)	3 (5.1)
Final Diagnoses	Primary Diagnosis No. (%) N=59	Any of up to 3 Diagnoses No. (%)* N=59
Allergic contact dermatitis	29 (49.2)	36 (61.0)
Irritant contact dermatitis	10 (16.9)	13 (22.0)
Other dermatitis	8 (13.6)	10 (16.9)
Atopic dermatitis	7 (11.9)	12 (20.3)
Other dermatoses	3 (5.1)	5 (8.5)
Psoriasis	1 (1.7)	2 (3.4)

[†] Anatomic site and diagnosis data missing for 1 patient

*percentages add up to >100% as up to 3 sites/3 diagnoses could be coded per patient