

A Practical Guide to Patch Testing

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Contact dermatitis is a common disease seen by allergists, dermatologists, and primary care physicians. The gold standard for diagnosing allergic contact dermatitis (ACD) is patch testing and is indicated in any patient with a chronic, pruritic, eczematous, or lichenified dermatitis if underlying or secondary ACD is suspected. Patients with acute generalized dermatitis who have extensive eczema on the back, are on immunosuppressant medications, and have applied topical corticosteroids, topical calcineurin inhibitors, or ultraviolet radiation to the patch test (PT) site may have suppressed PT reactions. The procedure of patch testing is not a difficult one to perform, but the interpretation of the PT needs some critical components, including having an appropriate level of suspicion for the diagnosis of ACD, testing the relevant allergens in their proper vehicle and concentration, and the necessary experience to properly interpret the results. Careful history and physical examination must be correlated with the result of the PT to establish clinical relevance. Once the PT is completed, allergens are identified, and relevance has been established, educating the patient about the avoidance of exposure is critical. The Joint Task Force of the American Academy of Allergy, Asthma and Immunology and American College of Allergy, Asthma and Immunology has developed updated practice parameters for contact dermatitis and patch testing, and their recommendations will be discussed (Fonacier LF, Bernstein DI, Pacheco K, Holness DL. Contact dermatitis: a practice parameter update 2015. *J Allergy Clin Immunol Pract* 2015; 3(3S):S1-S40.). © 2015 American Academy of Allergy, Asthma & Immunology (*J Allergy Clin Immunol Pract* 2015;3:669-75)

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Contact dermatitis (CD) is a common disease seen by allergists, dermatologists, and primary care physicians. Studies have shown that history and physical examination alone are not adequate to consistently and fully evaluate a patient's contact allergens. The gold standard for diagnosing allergic contact

dermatitis (ACD) is patch testing. The procedure of patch testing is not a difficult one to perform especially with the availability of preloaded allergens such as in the T.R.U.E. Test. However, the interpretation of the patch test (PT) needs an appropriate level of suspicion for the diagnosis of ACD, testing the relevant allergens in their proper vehicle and concentration, the necessary experience to properly classify the results and to determine their relevance, and the ability to thoroughly educate the patient about the avoidance of exposure. The differences in patch testing practices among physicians and their knowledge and experience with patch testing, their level of interest and access to allergens may affect the performance, results, reliability, and interpretation of the PT, and ultimately the benefits gained from this procedure.

WHOM TO PATCH TEST

Patch testing is indicated in any patient with an acute or chronic, pruritic, eczematous, or lichenified dermatitis if underlying or secondary ACD is suspected. Patients with AD are at heightened overall risk of contact sensitization compared with nonatopic individuals likely due to their impaired skin barrier and plausible increase absorption of topically applied chemicals due to this impairment. Patients with AD also have chronic and daily exposure to allergens in their creams and ointments that leads to a greater cumulative skin exposure to topical treatments. Thus, PT should be done in patients with AD suspected to have ACD, especially those who do not respond to treatment, initially improve and then exacerbate, or present with a change of pattern of dermatitis. The suspicion of ACD is the first step in making the diagnosis, and this must be confirmed by patch testing. Studies have shown that history and physical examination alone are not adequate to consistently and fully evaluate a patient's contact allergens. History alone will evaluate only 29%-54% of ACD adequately.¹

There are other dermatological conditions that may resemble the clinical and/or histological appearance of CD such as atopic dermatitis, seborrheic dermatitis, dyshidrotic eczema, psoriasis, blistering diseases (dermatitis herpetiformis, bullous pemphigoid), scabies, autoimmune diseases (systemic lupus erythematosus, dermatomyositis), and cutaneous T-cell lymphoma. In some cases, procedures such as skin biopsies, KOH stain for fungal elements, and referral to a dermatologist may be warranted.

WHOM NOT TO PATCH TEST

Patients with acute generalized dermatitis or with extensive eczema on the back are not candidates for patch testing until the underlying dermatitis is controlled. Ideally, patients should not be on immunosuppressant medications such as systemic corticosteroids, cyclosporine, and/or mycophenolate before patch testing. However, if oral corticosteroids cannot be discontinued, some studies have shown that PT in patients on low

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Abbreviations used

AAAAI- American Academy of Allergy, Asthma and Immunology
 ACAAI- American College of Allergy, Asthma and Immunology
 ACDS- American Contact Dermatitis Society
 ACD- Allergic contact dermatitis
 CAPB- Cocamidopropyl betaine
 CD- Contact dermatitis
 NACDG- North American Contact Dermatitis Group
 PT- Patch test
 ROAT- Repeated Open Application Test
 TCI- Topical calcineurin inhibitors
 TCS- Topical corticosteroids

doses of prednisone (less than 20 mg/day) and cyclosporine may still yield clinically relevant results.² Topical corticosteroids (TCS), topical calcineurin inhibitors (TCI), or ultraviolet radiation applied to the PT site may also reduce allergic PT responses. Topical potent TCS or TCI should not be applied on the test site for 5 to 7 days before testing.^{3,4} Patients are advised not to have a suntan or use a sunbed 2-4 weeks before the PT. It is prudent not to PT patients who are pregnant or breastfeeding. Systemic antihistamines are generally not believed to interfere with the PT readings.

INSTRUCTIONS TO PATIENTS**Patient instructions before patch testing**

1. Do not expose your back to the sun or sunbed for at least 2 weeks before the patch testing.
2. Wear old, dark clothing as pen marks can stain clothes.
3. Discuss the particular substances that you come into contact with your physician. You may be asked to bring your own materials for testing.
 - a. Only small quantities are required, for example, a few drops or grams.
 - b. If possible, bring it in its original container with ingredient list, even if you do not think it is causing any problems or label items carefully with their common and chemical names—provide data sheets if available.
 - c. Bring cosmetics that you have discussed with your physician to be tested. This may include nail varnish, moisturizer, sunscreen, prescribed, and nonprescribed ointments, creams, and lotions. Shampoo and soap are not usually tested (these are intended to be washed off and may irritate the skin if left on the skin for 2 days).
 - d. If clothing is suspected, bring about a centimeter square of material taken from seams or other unimportant areas in contact with the affected skin.
 - e. Rubber gloves and footwear can be tested. Discuss with your physician if needed.
4. Preparation for testing:
 - a. Shower the morning of the test, as you cannot get your back wet from the time the patches are applied to the time of the second reading.
 - b. Do not put any creams or oils on your back the morning of the testing.
 - c. If there is hair on the back where the patches will be applied, shave (an electric razor is preferable) a day or two before testing (do not use chemical hair removal products).

5. Side effects are rare, but include:

- a. *Skin reddening and itching at the application site (a positive test result)*—this usually disappears after a few days. A strongly positive PT may cause a blister.
- b. *Persistent reaction*—some positive test reactions, for example, to gold, may persist for up to a month.
- c. *Flare of eczema*—a positive PT may be accompanied by a flare of existing or previous eczema.
- d. *Pigment change*—an increase or decrease in pigment may be seen at the site of patch tests; this may last for months or rarely (1 in 1000) is permanent.
- e. *Infection*—this is rare and would need antibiotic treatment.
- f. *Scarring*—very rare (1 in 10,000).
- g. *Allergy*—rarely, in approximately 1 in 5000 patch tests, you may become allergic to one of the substances applied during patch testing. In practice, this does not seem to cause problems in the long term.

Patient instructions after patch tests are applied

1. Do not swim, rub, or exercise, as the patches may come off. Avoid sweating, excessive physical activity, or playing sports during testing.
2. Keep the back dry, so no baths, showers, or unnecessary sweating.
3. Do not expose your back to sunlight during the testing.
4. Most patients have 3 appointments. For allergies that may take longer to appear, delayed reading 7-10 days after application may be scheduled.
 - a. Appointment 1: patch test application. The substances to be tested will be applied to your back in special small containers and/or chambers held within a tape and labeled with ink. This appointment may take up to 2 hours. The substances remain taped in place until your next visit, when the patches containing them are removed and any reactions noted.
 - b. Appointment 2 (48 hours after patches are applied): the patches are removed, re-marked, and the back will be looked at 20-30 minutes after removal of the patches. This appointment may take up to 1 hour.
5. Appointment 3 (72 hours to 7 days after patches are applied): the physician will examine your back and any further reactions will be discussed with you.
6. If the patches are extremely itchy painful or burning, please call our office if you are concerned.
7. If a patch starts to peel off, reinforce with tape such as Micropore or Scanpor. If a whole patch comes loose, remove it and note the time and date.
8. It is possible that the PT will be negative. This is helpful in eliminating contact allergy to the substances tested as a cause of your skin problem. Positive reactions become red and itchy at the test site and usually become apparent by the third visit (final reading); however, they can occasionally take longer, up to 2 weeks. For certain late-reacting substances, a reading may be scheduled 7-10 days after PT application. If you do develop a late reaction after your last reading, please contact the office.

PATCH TEST ALLERGENS

The standard and/or additional series of PT allergens are sold by companies working in close connection with the International Contact Dermatitis Research Group (ICDRG) and other

international and national groups. Most of these allergens are dispersed in white petrolatum as its vehicle. Those that cannot be dispersed in white petrolatum due to the chemical stability are supplied in aqueous form. A core or baseline series of PT antigens such as those used by the North American Contact Dermatitis Group (NACDG), the T.R.U.E. Test panel, or the Core Allergen Series outlined by the American Contact Dermatitis Society (ACDS) may be used. However, relying solely on these series in all patients is likely to lead to underdiagnoses of ACD. Studies have shown that approximately 25% of relevant allergens may be missed if supplementary allergens are not used.^{5,6} Thus in addition to using a core or baseline series of PT allergens, consider using supplemental PT allergens based on specific patient exposures and the patient's personal products.

There are no head-to-head studies between the NACDG recommended series, the T.R.U.E. Test, or the ACDS core antigen panel. Hypothetically, the T.R.U.E. Test would have detected 69.7% to 75.1% of reactions that were positive in the NACDG screening series. Of the top 40 NACDG allergens, the antigens that are not in the T.R.U.E. Test and could therefore be missed are fragrance mix II, iodopropynyl butylcarbamate, carmine, propylene glycol, propolis, dimethylaminopropylamine, hydroxyethylmethacrylate, oleamidopropyl dimethylamine, shellac, decyl glucoside, cocamidopropyl betaine (CAPB), majantol, DMDM hydantoin, and glutaral.⁷

Kits with allergen panels selected for a specific industry such as machinists, cosmetologists, or dental workers, or for specific exposures such as cosmetics, textiles, plastics, and glues, and medications and topical treatments may be obtained from different manufacturers (Appendix A). In eyelid, lip, and facial dermatitis, it may be necessary to include the patient's personal products. In general, leave-on products (eg, lipstick, rouge, moisturizer, and foundation), clothing, and gloves can be tested as is. Rinse-off products (eg, shampoo, conditioners, and antiperspirant) should be diluted (10^{-2} or 10^{-3}) as they can be irritants.⁸ Other nonstandardized allergens, household cleansers, and industrial products should only be tested by physicians with expertise on this type of testing after evaluating the material safety data sheets information. Some of these chemicals can be extremely toxic to the skin and on rare occasions even produce systemic effects. Agents such as solvents (gasoline, kerosene, diesel oil), lime, benzene, toluene, rust removers and unknown substances should not be patch tested. Resources such as De Groot's *Test Concentrations and Vehicles of 4350 Chemicals* are available to help determine appropriate testing concentrations, vehicles, and controls.⁹

The T.R.U.E. Test system is a preloaded thin-layer rapid use epicutaneous testing kit of 36 chambers with 35 antigens and a negative control. These are the only approved PT antigens in the United States, are easy to apply but lack flexibility, and currently have a limited number of allergens available. The NACDG recommended series comprise 65-70 allergens (some in different vehicles and concentrations) and are used as a screening and research tool to track trends in delayed-type contact sensitization such as prevalence and relevance. The ACDS has a core allergen series of suggested 80 allergens that can be scaled up or down depending on the needs of the physician and the patient being tested. The allergens are arranged with more likely allergens being higher in the tray. Although the NACDG and ACDS recommended screening panels are not Food and Drug Administration approved, they conform to standards of care

recommended by CD experts.¹⁰ In separate studies, 62%-63% overall positive concordance rates were reported between the Finn chamber system and T.R.U.E. Test methods.¹¹

There are different loading chambers currently available in different shapes and materials. Square chambers include AllergEAZE, AllergEAZE Clear, Van der Bend, and IQ Ultra. Round chambers include the Finn Chamber (sizes 8, 12, and 18 mm), Curatest, and Curatest F. Aluminum and plastic chambers are also available. Plastic chambers are made up of polyethylene or polypropylene. Differences in shape and material however do not show superiority over another. The Finn Chambers need a filter paper disk to absorb liquid allergens, whereas other chambers have the filter paper built in the chambers.

PATCH TESTING METHODOLOGY

Test site

The upper back is the preferred site, as the concentration of standard allergens has been determined for the skin of the back only. This has also the biggest surface area on which to apply the tests. The area must be free of hair, and moisturizers and other oily substances should not be applied before application of the patches. In some circumstances, the upper parts of the arm may be used.

Loading the chambers

Ideally, tests should be prepared at the time they are placed as early preparation of volatile allergens may result in false-negative results. The general rule is that acrylates, fragrances, and allergens in aqueous vehicle should be loaded in the chambers and placed on the patient right away. However, some allergens on petrolatum base may be prepared 24-48 hours before application.

Lay out the strips of chambers and apply a 5 mm ribbon of petrolatum-based antigen to each disk. For liquid antigens, place a filter paper disk (if needed) and apply a drop of liquid, just sufficient to soak the disk. Remember that when applied to the back, the order of the antigens is left to right reversed. Thus, when loading the antigen on the chambers, it is best to apply the first antigen on the first row on your right.

Application of the PT

Clean the back with water and pat dry. Do not use alcohol as this could be irritating. During the application of the PT, instruct the patient to sit erect with shoulders dorsiflexed. The chambers are applied to the upper or mid-back areas (2.5 cm lateral to a mid-spinal reference point, as patches applied to the mid-spinal area frequently become detached), which must be free of dermatitis and hair. Test strips should be applied from below upward with mild pressure to remove air pouches, followed by firm strokes to improve adhesion. Press the top of each chamber gently to obtain even distribution of the allergen. After the PT is affixed, mark the top and bottom of each strip. Marking pens are available, but a fluorescent pen or even a regular felt tipped permanent marker would suffice. The patient must be warned that overlying clothing may be stained. The patches may be reinforced with additional tape. The occlusive patches should be kept in place and dry for a period of 48 hours unless a severe reaction, such as significant discomfort, at the site occurs. However, if contact urticaria is considered, the PT has to be checked at 20-30 minutes after application. Patch tests are then marked and recorded on a record sheet.

(-)		Negative reaction
(?+)		Doubtful reaction with faint erythema only
(1+)		Weak positive reaction with non-vesicular erythema, infiltration, possibly papules
(2+)		Strong positive reaction with vesicular erythema, infiltration, and papules

FIGURE 1. Scoring system for patch testing and a visual key.

TIMING OF THE PATCH TEST READING

The patches are removed and the initial reading of PT should be done at approximately 48 hours after their application.¹² The tests are read 20-30 minutes after removal of the patches to allow erythema from the occluding pressure or stripping of the tape and/or the chamber to resolve. Remarketing is done at this time with a light-sensitive marker or a felt-tipped permanent marker. Some authors do not use skin markers but a reading plate.

A second reading should be done between 3 and 7 days after application. Approximately 30% of relevant allergens that were negative at the 48-hour reading became positive at a 96-hour

reading, which suggested that 96 hours may be optimal for a second reading.¹³ For example, the patch test clinic would apply the tests on day 1 (usually a Monday), remove the patches and do the first reading on day 3 (Wednesday, 48 hours), and do a second reading on the third visit on day 5 (Friday, 96 hours).

Although not ideal, in special circumstances where the patient is unable to come for 3 visits, the patches can be removed by the patient or local physician at 48 hours and read by the treating physician in 72-96 hours. In these instances, there is a loss of the ability of the provider to verify the adherence of the patches. Patients can be instructed to take a picture of the back before

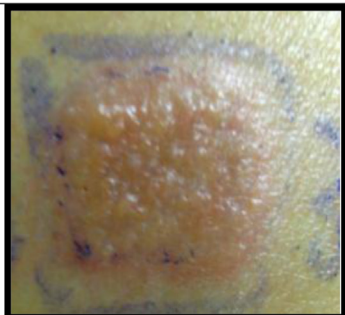
(3+)		Extreme positive reaction with intense erythema and infiltration, coalescing vesicles, bullous reaction
(IR)		Irritant reaction
(NT)		Not tested

FIGURE 1. (Continued).

removing the patch (to help the clinician determine the integrity of the PT system, and to record any nonadherent or loose patches), and another picture after removing the patch. They should also relabel the PT sites after removal. For contactants such as metals (nickel sulfate, gold sodium thiosulfate, palladium chloride, potassium dichromate, cobalt chloride), some antibiotics (neomycin), TCS (tixocortol-21-pivalate, budesonide), and dyes (para-phenylenediamine),¹⁴⁻¹⁶ consider a late reading 7-10 days after PT application if there is a negative early reaction, when the clinical history strongly supports sensitization, as they are associated with late peak reactions. On the other hand, allergens reported to peak early include thiuram mix, carba mix, and balsam of Peru.

Some irritant reactions that appear within the first 48 hours tend to disappear (decrecendo effect) by 96 hours,¹⁷ whereas allergic reactions tend to increase (crescendo effect). Thus the third visit is important to help determine if the reaction is an irritant or an allergic one.

INTERPRETATION OF THE PT

The ICDRG published a descriptive scoring system in 1970,¹⁸ which standardized the reading of the PT. This continues to be widely used (see Figure 1).

Many variables contribute to the strength of the PT reaction, including the concentration and potency of the allergen, the degree of subject sensitization, the length of application time, and the timing of the readings.¹⁹ The greatest cause of misinterpretation is due to (?+) doubtful or (1+) weak positive reaction categories. In such cases, it is important to consider the allergen, the timing of the reading, and the patient's history for clinical relevance. A weak reaction at day 7 is more likely to be clinically relevant than one at day 3. A crescendo effect is more likely in ACD. In some cases, the strength of the reaction on the skin does not necessarily correlate with clinical relevance. For example, aminoglycosides may cause

weak reactions on PT that are nonetheless clinically relevant.²⁰ In the case of TCS, patch testing is complicated by the inherent, anti-inflammatory nature of the drug itself and false-negative results may be obtained if tested at a very high concentration and/or no delayed reading (7-10 days after application) is done. Although there are more commercially available PT to TCS available, the commonly used T.R.U.E. Test Panel that includes tixocortol pivalate, budesonide, and hydrocortisone-17-butyrate plus the patient's commercial corticosteroid may detect more than 90% of TCS allergy. However, PT to vehicles, excipients, and preservative components of the TCS should also be done.

Finally, if performed and interpreted correctly, negative PT results can still provide valuable information by excluding sensitivity to the allergens tested. Obviously, further testing may be necessary, depending on how extensive and relevant the initial testing series was.

FALSE-POSITIVE REACTIONS

A false-positive reaction can result from the use of irritants or even allergic substances at potentially irritating higher concentrations; pressure reaction from the filling chamber; an "angry back" or "excited skin" syndrome or patch testing on skin with active dermatitis.

The "angry back syndrome" is defined as false-positive reactions adjacent to large true positive reactions that induce contiguous skin inflammation and irritability. Patients with the "angry back" or "excited skin" syndrome may have generalized reactivity to most or all allergens tested. The underlying mechanisms are not fully understood. This may occur in approximately 6.2% of patch-tested patients and was more likely to develop in patients with a longer duration of the primary dermatitis.²¹ The "angry back syndrome" should be suspected in patients with more than 5 reactions in close proximity to each other. If suspected, repeat the PT with greater separation of

allergens or sequentially if the initial reactions are not clinically relevant, because false-positive reactions are not reproducible when the triggering allergens are removed.²²

The position of allergen in the multiple allergen template may also give rise to the false-positive results, especially if cross-reacting or cosensitizing substances are tested in too close proximity.²³ A pustular patch reaction is an irritant reaction and is common in atopic individuals especially in response to metals such as nickel, copper, arsenic, and mercuric chloride. The test site is only minimally pruritic.

FALSE-NEGATIVE REACTIONS

The frequency of false-negative results is not known, but has been estimated to occur in up to 30% of patch-tested patients.²⁴ Possible causes are due to the antigen, skin reactivity, or methodology. Antigens tested at too low a concentration may not elicit a response. The wrong carrier vehicle may result in insufficient penetration of the allergen in the skin. Prior ultraviolet light exposure (ie, sun, tanning bed), TCS and TCI application on the PT area, and concomitant immunosuppressive therapies may inhibit a positive patch response. Methodological testing errors such as insufficient occlusion, failure to perform delayed readings, and failure to perform a photo PT may give a false-negative reaction.

DETERMINATION OF THE RELEVANCE OF A PT

Careful history and physical examination must be correlated with the result of the PT to establish clinical relevance. A positive PT may be clinically relevant depending on current or past exposures.

Current relevance is defined as *definite* if the PT or use test with the suspected material is positive (refer to Repeat Open Application Test). This occurs if an allergen is found in the patient's environment (example: fragrance in the patient's foundation), the dermatitis corresponds to the point of contact with allergen (face), and the dermatitis improves with avoidance or recurs with rechallenge. Relevance is *probable* if the antigen is present in known skin contactants and the clinical presentation is consistent with that exposure. This can occur if the allergen is found in the patient's environment and the dermatitis corresponds to the point of contact with allergen but follow-up information on improvement with avoidance or rechallenge not available. Relevance is *possible* if skin contact with materials known to contain the allergen was likely. Past relevance is considered if the PT is positive but the exposure was in the past, and not the present.^{25,26}

Relevance has been shown to vary with allergens. For example, CAPB shows 89.2% present relevance,²⁷ whereas thimerosal showed present relevance in only 7.3% of cases, likely because sensitization occurred during childhood vaccination.

VARIABILITY IN PATCH TEST RESULTS

Variable results in the PT could be due to several factors.²⁸

1. *Materials*: the type of PT system used, sources of the PT allergens, vehicle and concentration of the allergens tested, and distribution of allergens in the vehicle.
2. *Methodology and technical reasons*: the criteria used in patient selection, the application of the tests, the amount of allergen applied, errors in the sequence of consecutive allergens, the

times the tests were read, dissimilar pressure supported by the system according to the area of application, the integrity of the tests (partial or complete detachment of patches), and interpretation of the responses (intraobserver and interobserver variability and scoring scale used).

3. *Biological reasons*: regional variations in skin absorption and responsiveness, cyclic variations throughout the menstrual cycle, intercurrent factors (drugs, sun exposure, active dermatitis), skin hyporeactivity ("silent back syndrome"), and skin hyperreactivity ("excited skin syndrome").

PATIENT EDUCATION

Once the PT is completed, allergens are identified, and relevance has been established, education is critical. Telling a patient what chemical they are allergic to is not enough. For cosmetic products, avoidance is especially difficult as typical allergen names are long, have numerous complex synonyms, difficult to spell, have cross-reacting chemicals, and are often intimidating for patients. Thus, just giving the name makes compliance with allergen avoidance difficult. Reviewing the products used by the patient in the office can be very helpful. There are currently 2 computer-generated databases available in the United States that list products that are free of the suspected allergens: Contact Allergen Management Program, which is available for members of the American Contact Dermatitis Society (www.contactderm.org), and the Mayo Clinic's SkinSAFE Database (www.SkinSAFEapp.com). Providing the patient a list of products they can use improves compliance.

REPEATED OPEN APPLICATION TEST (ROAT)

An open PT technique has been used to test substances with the potential for irritation, and can be used to evaluate a doubtful or negative PT response in a patient suspected of ACD. It can also confirm that the patient is reacting to that particular product or determine clinical tolerability to new cosmetic products. The ROAT involves the repeated application of a suspected allergen to the antecubital fossa twice daily for up to 7 days and observing for the development of dermatitis up to 3 weeks. To replicate the reactivity of eyelid skin, the ROAT can also be performed on the back of the ear. Although the threshold concentration for a positive reaction for the ROAT per application was significantly lower than the threshold concentration for a positive PT, the accumulated ROAT dose was very similar to the PT.²⁹ A Usage Test can also be performed with the daily direct application of the undiluted product on the skin to which the product is normally applied, under real world conditions.

Summary

1. ACD should be suspected in patients with an acute or chronic, pruritic, eczematous, or lichenified dermatitis, and the gold standard for diagnosing ACD is patch testing.
2. Patients with acute generalized dermatitis or on immunosuppressant medications such as systemic corticosteroids, cyclosporine, and/or mycophenolate may have a false-negative PT result.
3. TCS, TCI, or ultraviolet radiation to the PT site may reduce allergic PT responses.
4. Patch test allergens include a core or baseline series such as those used by the NACDG, the T.R.U.E. Test panel, or the

ACDS Core Allergen Series. In addition, supplementary allergens and the patient's personal products may be used.

5. The patches are removed and the initial reading of the PT should be done at approximately 48 hours after their application. A second reading should be done between 3 and 7 days after application with a 96-hour reading as likely the optimal time for a second reading.
6. For contactants such as metals, some antibiotics, TCS, and dyes, a late reading 7-10 days after PT application is recommended.
7. Careful history and physical examination must be correlated with the result of the PT to establish clinical relevance.
8. Once the PT is completed, allergens are identified, and relevance has been established, patient must be educated about their allergens, where to find them, how to avoid them, and what alternative products they can use.

A helpful link containing a series of instructional videos including the application of patch testing is available at: <http://www.myPatchLink.com>.

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APPENDIX A: COMMERCIAL SOURCES OF PATCH TEST ALLERGENS

AllergEAZE by Smart Practice Canada
SmartPractice® Canada
2175 29th Street NE, Unit 90
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