CONTACT DERMATITIS IN CHILDREN:
THE TOP 10 ALLERGENS

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Rady Children’s Hospital San Diego
What is Allergic Contact Dermatitis...

• Is a type IV delayed-type hypersensitivity reaction to haptens that come into contact with the skin.
Haptens are usually small molecule substances (<500 Da) that easily penetrate the skin barrier.
The skin barrier

- Some haptens can penetrate intact skin
- Increase rates of allergic sensitization in patients with atopic dermatitis → Defective skin barrier.
- Filaggrin mutations have been found in patients with atopic dermatitis and in patients with ACD to nickel.*
- Filaggrin helps to aggregate the cytoskeletal proteins that form the cornified cell envelope.
- Without filaggrin the barrier is defective

Haptens induce pro-inflammatory cytokine production by skin cells. DCs activated directly by haptens and indirectly by pro-inflammatory mediators.

Mast cell mediators activate DCs and skin cells.

Migration to draining lymph nodes.

**Draining lymph node**

Cross-presentation

- Effector CD8+ T cell induction
- T\(_{\text{H}1}\) cell induction
- T\(_{\text{H}17}\) cell induction
- Role in effector T cell induction is unclear.
When to suspect Allergic contact dermatitis?

Look for the clues ...
Chronic eczema unresponsive or worsen by common therapies
Localized new onset dermatitis
New onset dermatitis in "older patients"
Atypical locations for AD

eyelid, perioral, scalp, neck, extensor surfaces, hands and feet
When to suspect ACD

• Photo or airborne pattern
Occupational/sport/activity relationship
What to do when you suspect ACD?

• Treat the dermatitis
  – Use adequate potency of corticosteroids
  – Most of the time you need mid strength to high strength corticosteroids for body lesions
  – If suspect poison ivy or severe contact reaction may need to treat with systemic corticosteroids with a slow taper of 3 -4 weeks.

• Improve skin the barrier
  – Use of moisturizers

• Limit use of irritant products
  – Fragrances, formaldehyde, cocamidopropyl betaine

• AVOIDANCE AVOIDANCE AVOIDANCE AVOIDANCE
## MOST COMMON ALLERGENS

### Contact derm Registry 2015

| Allergen                                      | PPT*|| (%)**# | RPPT*|| (%)**# |
|-----------------------------------------------|-------|---------|-------|---------|
| Nickel sulfate                                | 243 (22) | 148 (13) |
| Fragrance mix I                               | 123 (11) | 103 (9.4) |
| Cobalt dichloride                              | 102 (9.1) | 44 (4)   |
| Balsam of Peru (*Myroxylon pereirae*)          | 94 (8.4) | 73 (6.5) |
| Neomycin sulfate                               | 80 (7.2) | 49 (4.4) |
| PG†† 30%                                      | 56 (6.8) | 40 (5)   |
| CAPB††                                        | 53 (6.4) | 38 (4.6) |
| Bacitracin                                     | 69 (6.2) | 52 (4.6) |
| Formaldehyde                                   | 64 (5.7) | 49 (4.4) |
| Gold sodium thiosulfate                       | 63 (5.7) | 20 (1.8) |
| 2-bromo-2-nitropropane-1, 3-diol               | 55 (5)   | 38 (3.4) |
| Wool (wax) alcohols                           | 54 (4.8) | 38 (3.4) |
| MI††                                          | 49 (4.4) | 40 (3.6) |
| Amerchol-L101-lanolin alcohol††               | 47 (4.2) | 39 (3.5) |
| MCI/MI                                        | 47 (4.2) | 35 (3.1) |

### PEAs Review

<table>
<thead>
<tr>
<th>Allergen</th>
<th>% of children across five studies given allergen</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Neomycin</td>
<td>5.77%</td>
</tr>
<tr>
<td>2 BOP</td>
<td>4.92%</td>
</tr>
<tr>
<td>3 Fragrance Mix (1)</td>
<td>4.56%</td>
</tr>
<tr>
<td>4 Benzalkonium chloride</td>
<td>4.37%</td>
</tr>
<tr>
<td>5 Lanolin</td>
<td>4.34%</td>
</tr>
<tr>
<td>6 CAPB</td>
<td>2.89%</td>
</tr>
<tr>
<td>7 Formaldehyde</td>
<td>2.89%</td>
</tr>
<tr>
<td>8 MCI/MI</td>
<td>2.61%</td>
</tr>
<tr>
<td>9 Propylene glycol</td>
<td>2.03%</td>
</tr>
<tr>
<td>10 Corticosteroids*</td>
<td>1.73%</td>
</tr>
<tr>
<td>Nickel sulfate*</td>
<td>22.70%</td>
</tr>
<tr>
<td>Cobalt chloride*</td>
<td>8.57%</td>
</tr>
</tbody>
</table>

*Dermatitis. 2016 Sep-Oct;27(5):293-302

SAMPLE LIST OF SAFE PRODUCTS

Try the simplified product list for at least 8 weeks!!

**Table 4. Example products free of top 10 allergens and cross-reactors.**

<table>
<thead>
<tr>
<th>Product type</th>
<th>Brand</th>
<th>Product</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cleansers</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Albolene</td>
<td>Albolene Moisturizing Cleanser Unscented Facial Cleanser</td>
</tr>
<tr>
<td></td>
<td>Aqua Glycolic</td>
<td>Facial Cleanser</td>
</tr>
<tr>
<td></td>
<td>Beb Piglet</td>
<td>DRY SKIN FORMULA Moisturizing Body Bar</td>
</tr>
<tr>
<td></td>
<td>CeraVe</td>
<td>CeraVe Hydrating Cleanser</td>
</tr>
<tr>
<td></td>
<td>CeraVe</td>
<td>CeraVe Gentle Facial Cleanser</td>
</tr>
<tr>
<td></td>
<td>Cleure</td>
<td>Glycerine Face/Body SLS Free Soap</td>
</tr>
<tr>
<td></td>
<td>Dermalab</td>
<td>Wash It Cleansing Bar for Sensitive Skin</td>
</tr>
<tr>
<td></td>
<td>Free &amp; Clear</td>
<td>Liquid Cleanser for Sensitive Skin</td>
</tr>
<tr>
<td></td>
<td>Magick Botanicals</td>
<td>Unscented Bar Soap</td>
</tr>
<tr>
<td></td>
<td>Neutrogena</td>
<td>Ultra Gentle Hydrating Cleanser</td>
</tr>
<tr>
<td></td>
<td>Vanicream</td>
<td>Vanicream Gentle Facial Cleanser</td>
</tr>
<tr>
<td></td>
<td>VMV Hypoallergenics</td>
<td>Moisture Rich Creamy Cleansing Milk for Dry Skin</td>
</tr>
<tr>
<td></td>
<td>CeraVe</td>
<td>CeraVe Moisturizing Cream</td>
</tr>
<tr>
<td></td>
<td>Cetaphil</td>
<td>Cetaphil Intensive Moisturizing Cream with Shea Butter</td>
</tr>
<tr>
<td></td>
<td>Cleure</td>
<td>Body Lotion for dry sensitive skin</td>
</tr>
<tr>
<td></td>
<td>Derma Topix</td>
<td>Intensive Hand Cream</td>
</tr>
<tr>
<td></td>
<td>EltaMD</td>
<td>Moisturizer Intense</td>
</tr>
<tr>
<td></td>
<td>Eucerin</td>
<td>Professional Repair Extremely Dry Skin Lotion</td>
</tr>
<tr>
<td></td>
<td>Exederm</td>
<td>Soothing Baby Oil</td>
</tr>
<tr>
<td></td>
<td>Glaxal base</td>
<td>Moisturizing cream</td>
</tr>
<tr>
<td></td>
<td>Magick Botanicals</td>
<td>Oil Free Moisture Lotion</td>
</tr>
<tr>
<td></td>
<td>Neutrogena</td>
<td>Norwegian Formula Hand Cream Fragrance-Free</td>
</tr>
<tr>
<td></td>
<td>Theraplex</td>
<td>Emollient for Severely Dry Skin</td>
</tr>
<tr>
<td></td>
<td>TriCalm</td>
<td>Clinical Repair Cream</td>
</tr>
<tr>
<td></td>
<td>Cheryl Lee MD Sensitive Skin Care</td>
<td>TrueLipsidts Relieve and Protect Ointment</td>
</tr>
<tr>
<td><strong>Moisturizers</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Vaniply</td>
<td>Vaniply Ointment Dry Skin Care for Sensitive Skin</td>
</tr>
<tr>
<td></td>
<td>Vaseline</td>
<td>Vaseline Petroleum Jelly</td>
</tr>
<tr>
<td></td>
<td>VMV Hypoallergenics</td>
<td>Hydra Balance Smart Moisturizer for Combination Skin</td>
</tr>
</tbody>
</table>

Shampoos

- **AFM SafeChoice** | Skin Shampoo & Body Wash
  - Free & Clear | Shampoo for Sensitive Skin

VMV Hypoallergenic

- Essence Skin-Saving Clark Wash + Body ‘Big Softie’ Shampoo
- Essence Skin-Saving Superwash Hair + Body Milk Shampoo
- Replenishing Conditioner
- Replenishing Conditioner Hair Conditioner for Sensitive Skin

Atopic dermatitis medications

- Magick Botanicals | Spray-On Detangler and Conditioner
- Neutrogena | EpiCream Skin Barrier Emulsion
- A&D | Aurstat Anti-Itch Hydrogel
- Aurstat | Aurstat Anti-Itch Hydrogel
- Eletone | Eletone Cream
- Totes | Totes Cream

yes it's T.R.U.E.™
i'm allergic to poo!

T.R.U.E.™ Test

- hugs
- ++hunger
- ++poopy diapers
- kisses
- mommy
- daddy
PATCH TESTING

• T.R.U.E Test

• Comprehensive patch testing
Tixocortol Pivalate

- Patch test allergen for Class A of topical corticosteroids
  - Hydrocortisone acetate (OTC TCS)
- Cross reacts with Class D2
  - the other HC, butyrate and valearate
- Higher frequency in patients with Atopic dermatitis
- Suspect
  - AD not responding or worsened by use of TCS
  - In adult patient with chronic ulcers and patient with puritus ani- hx of hemorrhoids.
## TIXOCORTOL PIVALATE

<table>
<thead>
<tr>
<th>Structural Class</th>
<th>Class A: Hydrocortisone Type</th>
<th>Class B: Thiadinozone Acetonide Type</th>
<th>Class C: Betamethasone Type</th>
<th>Class D1: Betamethasone Dipropionate Type</th>
<th>Class D2: Methylprednisolone Acetonide Type</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CLASS 7: LEAST POTENT</strong></td>
<td>Hydrocortisone</td>
<td>Fluocinolone acetonide 0.01% G</td>
<td>Betamethasone dipropionate 0.05% G</td>
<td>Natamoxone butyrate 0.1% G, O, S, F</td>
<td>Hydrocortisone valerate 0.1% G, O, S, F</td>
</tr>
<tr>
<td><strong>CLASS 6: LOW POTENT</strong></td>
<td>Desonide 0.05% H</td>
<td>Fluocinolone acetonide 0.01% G</td>
<td>Betamethasone dipropionate 0.05% L</td>
<td>Natamoxone butyrate 0.1% G, O, S, F</td>
<td>Hydrocortisone valerate 0.1% G, O, S, F</td>
</tr>
<tr>
<td><strong>CLASS 5: LOWER MID-STRENGTH</strong></td>
<td>Desonide 0.05% H</td>
<td>Fluocinolone acetonide 0.1% G</td>
<td>Betamethasone valerate 0.1% C</td>
<td>Natamoxone butyrate 0.1% G, O, S, F</td>
<td>Hydrocortisone valerate 0.1% G, O, S, F</td>
</tr>
<tr>
<td><strong>CLASS 4: MID-STRENGTH</strong></td>
<td>Aminocortic 0.1% G</td>
<td>Fluocinolone acetonide 0.1% G</td>
<td>Betamethasone dipropionate 0.05% C</td>
<td>Natamoxone butyrate 0.1% G, O, S, F</td>
<td>Hydrocortisone valerate 0.1% G, O, S, F</td>
</tr>
<tr>
<td><strong>CLASS 3: UPPER MID-STRENGTH</strong></td>
<td>Aminocortic 0.1% G</td>
<td>Fluocinolone acetonide 0.1% G</td>
<td>Betamethasone dipropionate 0.05% C</td>
<td>Natamoxone butyrate 0.1% G, O, S, F</td>
<td>Hydrocortisone valerate 0.1% G, O, S, F</td>
</tr>
<tr>
<td><strong>CLASS 2: HIGH POTENT</strong></td>
<td>Budesonide 0.03% C</td>
<td>Fluocinolone acetonide 0.1% G</td>
<td>Betamethasone dipropionate 0.05% O</td>
<td>Natamoxone butyrate 0.1% G, O, S, F</td>
<td>Hydrocortisone valerate 0.1% G, O, S, F</td>
</tr>
<tr>
<td><strong>CLASS 1: SUPERPOTENT</strong></td>
<td>Budesonide 0.03% C</td>
<td>Fluocinolone acetonide 0.1% G</td>
<td>Betamethasone dipropionate 0.05% O</td>
<td>Natamoxone butyrate 0.1% G, O, S, F</td>
<td>Hydrocortisone valerate 0.1% G, O, S, F</td>
</tr>
<tr>
<td><strong>STRUCTURE</strong></td>
<td>No substitutions in the D ring, except C17 – short-chain esters</td>
<td>C16,17 = cis-diol or – ketol</td>
<td>C16 = methyl substitution</td>
<td>C16 = methyl substitution</td>
<td>C16 = methyl substitution</td>
</tr>
<tr>
<td><strong>CROSS-REACTIONS</strong></td>
<td>Cross-reacts with D2</td>
<td>Topical corticosteroids specifically cross-react with D2</td>
<td>Cross-reacts with D2</td>
<td>Cross-reacts with Class A and B</td>
<td>Cross-reacts with Class A and B</td>
</tr>
</tbody>
</table>

Propylene Glycol
Cetaphil® Gentle Skin Cleanser

Recommended by dermatologists and paediatricians for everyday, gentle cleansing of even the most sensitive skin.

- Fragrance, soap & lanolin free
- Gentle on baby’s skin
- Removes light make up
- Non-comedogenic (won’t block pores)
- Helps skin retain moisture
- pH balanced
- Won’t sting eyes
- For face & body

DIRECTIONS: With water • Apply and rub gently. Rinse.
Without water • Apply and rub gently. Remove excess with a soft cloth.

INGREDIENTS: Purified Water, Cetyl Alcohol, Propylene Glycol, Sodium Lauryl Sulfate, Stearyl Alcohol, Methyl Hydroxybenzoate, Propyl Hydroxybenzoate, Butyl Hydroxybenzoate.

www.cetaphil.com.au
PROPYLENE GLYCOL

• Odorless liquid used as a vehicle in medicaments and cosmetics
• Moisturizing and solvent qualities
• Patch test reactions are usually weak
  – High index of suspicion
• Can cause **systemic contact dermatitis**
  – In FOODS!!
<table>
<thead>
<tr>
<th>Type of Product</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sauces</td>
<td>Steak sauce, horseradish, tartar sauce</td>
</tr>
<tr>
<td>Snack foods</td>
<td>Potato snacks, fried onion rings</td>
</tr>
<tr>
<td>Desserts</td>
<td>Cinnamon buns, donuts, cupcakes, ice cream</td>
</tr>
<tr>
<td>Dessert kits</td>
<td>Cake mix, brownie mix, cream pie mix</td>
</tr>
<tr>
<td>Salad dressings</td>
<td>Various flavors; sour creams</td>
</tr>
<tr>
<td>Potato salads</td>
<td>Ibuprofen, acetaminophen, glucosamine/chondroitin sulfate, coated aspirin, many prescription medications (including clarithromycin, cetirizine solution, fosinopril, and dipyridamole)</td>
</tr>
<tr>
<td>Medications</td>
<td></td>
</tr>
</tbody>
</table>
Fireball Whisky recalled for excessive propylene glycol.

The Antifreeze Ingredient: Hiding Out in Your Food.

Share your allergy and/or eczema story:


PG misery.
Several years later
2+ Reaction to MCI/MI
Methylchloroisothiazolinone/Methylisothiazolinone (MCI/MI)

- Most reports of pediatric ACD to MCI/MI secondary to wet wipes
  - Recent wipe formulations don’t have MCI/MI
- MCI/MI found in approximately half of detergents containing preservatives
- Increasingly present in products marketed as “hypoallergenic” and “for sensitive skin”
- MCI/MI mix in True test, but can miss up to 40% of reactions to MI

# MCI/MI Where?

## Table 1. EXPOSURE TO ISOThIAZOLINONES

<table>
<thead>
<tr>
<th>Consumer Products</th>
<th>Industrial Products</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dishwashing products</td>
<td>Paints</td>
</tr>
<tr>
<td>Shampoos</td>
<td>Inks</td>
</tr>
<tr>
<td>Household cleaners</td>
<td>Glues</td>
</tr>
<tr>
<td>Hair conditioners</td>
<td>Lacquers</td>
</tr>
<tr>
<td>Laundry detergents/softeners</td>
<td>Varnishes</td>
</tr>
<tr>
<td>Soaps and cleansers</td>
<td>Cutting oils</td>
</tr>
<tr>
<td>Air fresheners</td>
<td>Jet fuels</td>
</tr>
<tr>
<td>Hand sanitizers</td>
<td>Pesticides</td>
</tr>
<tr>
<td>Baby wipes</td>
<td>Paper manufacturing</td>
</tr>
<tr>
<td>Vaginal products</td>
<td>Ultrasound gel</td>
</tr>
<tr>
<td>Sanitary napkin adhesives</td>
<td></td>
</tr>
<tr>
<td>Sunscreens</td>
<td></td>
</tr>
<tr>
<td>Moisturizers</td>
<td></td>
</tr>
<tr>
<td>Cosmetics</td>
<td></td>
</tr>
<tr>
<td>Pharmaceuticals</td>
<td></td>
</tr>
<tr>
<td>Children’s crafting supplies</td>
<td></td>
</tr>
</tbody>
</table>
Formaldehyde

- Allergen of the year in 2015
- Ubiquitous contact allergen
- Preservative and glue
- Provides special properties to certain fabrics when added.

*Hill et al. Contact dermatitis. 2003 Nov;49(5):258-9
**Jacob et al. Dermatitis 2008; 19(3): E10- E1
FORMALDEHYDE RELEASES

FORMALDEHYDE-RELEASING PRESERVATIVES

- Bromonitropropane diol (Bronopol)
- Diazolidinyl Urea (Germall II)
- DMDM Hydantoin (Glydant)
- Imidazolidinyl Urea (Germall)
- Quaternium-15
- Tris (Hydroxymethyl) Nitromethane (Tris Nitro)

Source: Dermatologic Therapy 2004;17:251-263.
Where?

### Sources of Exposure to Formaldehyde

- Anhidrotics and antiperspirants
- Building materials — pressed wood products such as particle board, plywood and MDF
- Canned ice
- Cellulose esters
- **Clothing made from fabrics finished with formaldehyde resins**
- Coatings — melamine, urea, sulfonamide, phenol resins
- **Cosmetics and toiletries**
- Disinfectants and cleaning agents
- Embalming fluid and fixatives
- Fabric and textiles
- Glues, pastes
- Medications
- Mildew preventative in fruits and vegetables
- Paints and primers
- **Paper products**
- Phenolic resins and urea plastics found in buttons, footwear and jewelry
- Photographic plates
- Polishes
- Preservatives
- Printing/etching materials
- Rubber cements
- Smoke
- Tanning agents
- Toxoids and vaccines
Clothing and Formaldehyde

- Permanent press
- Anti-cling, anti-static, anti-wrinkle and anti-shrink finishes
- Chlorine-resistant finishes
- Stiffening on lightweight nylon knits
- Waterproof finishes
- Perspiration proof finishes
- Moth proof and mildew resistant finishes
- Suede and chamois

What to wear?

100% cotton
Silk
polyester
nylon or acrylic
Malibu

SPF 6
BRONZING TANNING OIL
with COCONUT

LOW PROTECTION
PROTECTION FAIBLE

HUILE BRONZANTE
avec COCONUT
dermatologically tested
WATER RESISTANT

TESTÉ SOUS CONTRÔLE DERMATOLOGIQUE
RÉSISTANT À L'EAU
COCAMIDOPROPYL BETAINES

- Derived from coconut oil & dimethylaminopropylamine (DMAPA)
- Used as a surfactant and foaming agent in shampoos, conditioners, body washes, hair dyes, laundry detergents, hand soaps, toothpastes, cleaning products.
- Incidence between 3% to 7.2%
- Higher incidence in patients with AD
WE PREFER OINTMENT RATHER THAN CREAMS
Wool Alcohols- lanolin

- Derived from secretions of the sebaceous glands of sheep and functions as a protective coating on wool
- Lanolin alcohols = aliphatic alcohols, sterols (including cholesterol), and trimethyl sterols
- Patch testing recommend testing for Amerchol 101 and mix wools alcohols to decrease FN reactions. *
- Common allergen in patients with hx of atopic dermatitis
- Emollient
- Present in moisturizing creams, medications
- Personal care products

* Matthieu L, Dockx P. Contact Dermatitis 1997;36:150–1.
Active: Ofloxacin USP 0.3%
Preservative: Benzalkonium Chloride (0.005%)
Usual Dosage: See package insert.
FOR TOPICAL OPHTHALMIC USE ONLY
Retain in carton until contents are used. Protect from light.
Mfg. Lic. No. 1032
Benzalkonium Chloride

• Detergent and preservative

• Where?
  – Ophthalmic solutions, antifungal solutions, antiseptic bath oil, detergents, medicated adhesive tape, topical creams.
FRAGRANCE & BALSAM OF PERU

• Fragrance mix I
  – cinnamic alcohol
  – cinnamic aldehyde
  – hydroxycitronellal
  – amylcinnamaldehyde
  – geraniol
  – euginol
  – isoeuginol
  – oakmosse

• Fragrance mix II
  – Lyral
  – Citral
  – Citronellol
  – Farnesol
  – Coumarin
  – hexyl cinnamic aldehyde

Scents and Flavoring agents
BALSAM OF PERU

• Natural extract from bark of *Myroxylon pereirae*
• Mixture different contact allergens
  – cinnamenein oils (which contain cinnamates, eugenol, and vanillin)
  – benzoic acid derivatives
  – coniferin derivatives
• Marker for fragrance allergy
• Causes hand and face dermatitis
• Commonly in spices and flavoring agents and in cosmetic, **fragrances**, and medicinal products
• Can cause systemic contact dermatitis
• Most common causative foods in one adult study*
  – Tomatoes (33%), citrus fruits (30%), spices (23%), colas (17%), chocolate (10%), chili (10%)
• Specific allergens in tomatoes: cinnamic alcohol and coniferyl alcohol

*Salam et al. JAAD 2001:45; 3;77-381
Fragrance-Free
VS
Unscented
HIDDEN SCENT

Benzyl Alcohol
used as a preservative in multiple Fragrance free products
NEOMYCIN

- Triple antibiotic ointment contains Bacitracin, neomycin, and polymyxin B
- One of top contact allergens in children and adults
- Allergen of the year in 2010
- When to suspect?
  - In patient with chronic dermatitis not improving
  - Non healing ulcers
  - Geometric dermatitis around wounds.
  - Eyelid dermatitis
  - Ear dermatitis
- Co-reactors
  - Bacitracin
- Cases of systemic reactions reported following subconjunctival injection of famycetin and after vaccination with neomycin containing vaccines.
- Can cross react with other aminoglycoside antibiotics such as gentamycin, can cause systemic reactions.

REMEMBER ALL THAT GLITTERS IS NOT GOLD
NICKEL IS EVERYWHERE

ELECTRONICS WITH METAL COATING
Cellphones
IPADs
video games
NICKEL AT SCHOOL

School chair sign

Hamann DJ, JPediatr Dermatol. 2014 Mar-Apr;31(
What’s in your pockets
HOBBIES

Cobalt

- Co-sensitizer with Nickel
- Where?
  - Where nickel is
  - Cobalt blue in water colour paints and crayons
  - Hair dye
  - Cobalt blue in porcelain, enamel, pottery and glass
  - Leather
  - Vitamin B 12

Treatment

• AVOIDANCE AVOIDANCE AVOIDANCE
• Stop active reaction with topical corticosteroids
• Teach patients about dimethylglyoxime test and cobalt spot test to test for nickel and cobalt on products
Thank you!!!!