Chapter 21
The Sensitive Skin: Do's and Don'ts

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21.1 Introduction

Sensitive skin is characterized by predominantly subjective abnormal sensations of burning or pricking of the skin without persistent visible signs of erythema, though there is no universally accepted definition of sensitive skin [1]. Most patients present with unpleasant sensations like burning, tingling, smarting or pricking, sometimes accompanied with transient redness, tightness or dryness of skin, after coming in contact with routinely used skin products or cosmetics. In some cases, various environmental, chemical, physical, hormonal or psychological factors may be associated with the onset of sensitive skin [1–3].

Muizzuddin et al. defined sensitive skin on the basis of primary pathology, skin reactivity and stinging capacity. Delicate skin is the one with easy penetration of irritants due to disrupted barrier function, but shows only mild inflammatory response. On the other hand, reactive skin is less permeable to irritants but shows strong inflammatory response. Stingers have exaggerated neurosensory response to cutaneous stimuli [4]. Pons-Guiraud classified sensitive skin into very sensitive (a strong psychological impact as it may present with both acute and chronic symptoms and shows reactivity with both endogenous and exogenous factors), environmentally sensitive (dry, clear and thin, more prone to blushing or flushing and more reactive to environmental factors such as ultraviolet radiation, wind, cold and heat) and cosmetically sensitive (reactive to cosmetics or toiletries) [5]. Sensitive skin may be

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present in partially treated dermatoses such as rosacea (heightened neurosensory perception), atopic dermatitis (barrier disruption), seborrheic dermatitis, contact dermatitis (immune hyperreactivity), psoriasis, etc. In such cases, mild or transient erythema or scaling may be present and is termed visible sensitive skin, in contrast to invisible sensitive skin which shows no perceptible signs and is more difficult to discern [6]. Status cosmeticus or cosmetic intolerance of the face is a situation where intolerance to cosmetics persists even after resolution of skin diseases [7].

21.2 Pathophysiology of Sensitive Skin

Although the exact pathophysiology of sensitive skin is still unknown, the common consensus is that sensitive skin is the result of a low skin tolerance threshold. There is abnormal penetration of potential irritant agents into the skin due to defective skin barrier function [8]. Impaired barrier function may be due to altered intercellular lipids with increased neutral lipids and decreased sphingolipids, thinned stratum corneum, increased permeability leading to increased trans-epidermal water loss [1]. Abnormal neurosensory interaction between nerve growth factors, endothelin receptors and transient receptor potential receptors may lead to exaggerated sensitivity response [9].

21.3 General Skin Care of Sensitive Skin

The first step for sensitive skin care is to identify and avoid the causative agent or agents so as to prevent further sensitivity. This is often the most challenging step as myriad constituents in make up routine skin care and cosmetic products. The next step is to rule out or treat any underlying or accompanying cutaneous disorders like atopic dermatitis or rosacea. Finally, attempts should be made to repair the disrupted cutaneous barrier function. Basic key to cure or prevent sensitive skin is to use minimal cosmetic products with fewer ingredients with skin-friendly pH (5.5) so as to keep the skin intact and well hydrated [10]. Frequent use of moisturizers also helps in maintaining healthy skin (Fig. 21.1).

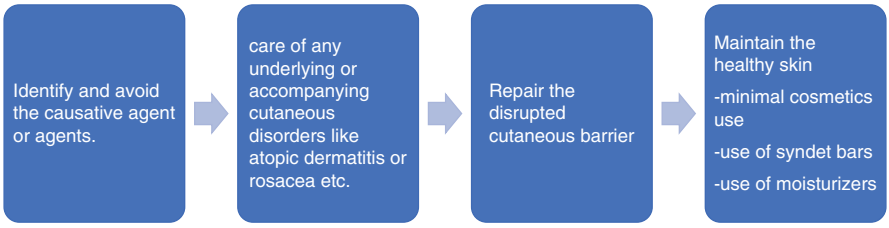

Fig. 21.1 Basic steps for sensitive skin care

21.4 Step 1: Identify and Avoid the Potential Source

1. In order to identify and avoid the potential source or cause of sensitive skin, Draelos suggested that all skin products like cosmetics, toiletries, over the counter or prescription topical medications like tretinoin should be stopped for 2 weeks [11]. Any potential source of friction is to be avoided for 2 weeks. This washout period also helps in revealing any underlying cutaneous diseases like rosacea or seborrheic dermatitis, which can be treated symptomatically [11]. Any product that causes discomfort and irritation should be stopped immediately.
2. During this washout period, use of syndet bars is recommended. Syndet bars are synthetic detergents that have synthetic surfactants like sulfosuccinic acid, sodium cocoyl isethionate, stearic acid, sodium stearate, etc. They have skin-friendly pH (neutral or slightly acidic), so their use causes minimal or no skin irritation along with preservation of cutaneous protein, natural moisturizing factor and lipid content. Charge density of protein bound surfactant aggregates of syndet bars causes minimal protein denaturation. High free fatty acid concentration also helps in hydration of skin [12, 13]. Hence, syndet bars help in recovery of sensitive skin and prevent further damage to skin. Simultaneously, their use also helps in management of the underlying cutaneous diseases like atopic dermatitis by providing a moisturizing effect [14, 15].
3. Body washes or liquid cleansers can be used in sensitive skin. They tend to both cleanse and moisturize the skin by using the two stages of cleansing depending upon the concentration gradient of water and the cleanser. Body washes have water as the primary ingredient along with syndets and moisturizers like vegetable oils, shea butter, petrolatum, etc. [15]
4. Water used for rinsing or washing should be lukewarm (and not hot).
5. Thermal spring water spritzers reduce skin sensitivity and erythema by calming, soothing and hydrating the skin. They repair skin by maintaining the superficial biomechanical and cutaneous ultrastructure [16]. Thermal spring water has a unique mineral composition and contains prebiotics and trace elements as well [16, 17].
6. For individuals like health care workers, frequent handwashing may lead to subjective irritation and sensitive skin of hands. Hand sanitizers, with either ethanol or quaternary ammonium compounds like benzalkonium chloride or benzethonium chloride can be used. In addition to this, frequent use of moisturizers or incorporation of emollients into the formulation helps in maintaining the skin healthy and hydrated.
7. No-rinse cleansers that can be applied and removed without the use of water are preferred for use in elderly patients with sensitive perianal or genital skin due to ageing or incontinence [18].

8. Cosmetics can be removed from the skin by use of special cleansers like micellar water cleansers, cleansing milk, cleansing balms, cleansing oils, cold cream cleansers and non-foaming cleansers. Micellar water cleansers are good for water soluble cosmetic products, while cleansing milk is used for eye makeup removal. For waterproof cosmetics, cleansing oils can be used. Cold cream cleansers are good for facial cosmetic removal and have additional moisturizing effect on skin [15].
9. Micellar water may be used as face cleanser and it uses the concept of micelle formation during interaction of surfactant and water. The hydrophobic end of micelle attaches itself to the dirt on skin and the hydrophilic end helps in rinsing with water. It can be applied gently by rubbing or dabbing on skin with the help of a cotton ball and rinsed off with water.
10. Skin should be gently pat dried after washing. This prevents the skin irritation that can be caused by rubbing and also keep the moisture intact.
11. Hair cosmetics—pH of shampoos should be neutral or slightly acidic in nature like syndet bars [19]. Shampoos contain various ingredients like a surfactant, conditioner, fragrances and preservatives. Various potential allergens are balsam of Peru, formaldehyde, Kathon CG, captan, FM1, FM2, cocamidopropyl betaine, etc. [20] Hence, care must be taken to identify if a shampoo is the contributory agent towards causation of sensitive skin. Products with irritating tensioactive surfactants should be avoided. Hair straightening products with formaldehydes must be avoided as they are not just irritant but are potentially carcinogenic in nature.
12. Baby shampoos usually are "tear free" as they contain betaine-like mild amphoteric detergents which have more favourable pH while the mild detergent action minimizes the skin irritation. However, care should be taken to decrease the contact time of skin care products to prevent any skin sensitivity.
13. Baby wipes are routinely considered as mild products but they contain methylisothiazolinone as preservative. This may lead to allergic sensitization in baby and/or in the caregiver [21].
14. Cosmetics with various irritants like propylene glycol, butylene glycol, alcohol, resorcinol, triethanolamine, cocamidopropyl betaine, etc. should be avoided [2].

21.5 Step 2: Care of Any Underlying or Accompanying Cutaneous Disorders

1. Any topical formulation that causes discomfort or burning sensation should be discontinued.
2. Sensitive skin due to underlying cutaneous diseases like rosacea can be precipitated by irritants like alcohol, astringents, toner, eucalyptus oil, camphor, fragrances, clove oils, etc. Hence, such products are to be avoided.

3. Products with sodium lauryl sulphate should be avoided due to their irritant potential.
4. Avoid intake of hot spicy food, chocolates, wine, tea and caffeine as they may exacerbate symptoms due to high vascular reactivity in sensitive skin and rosacea [22].
5. For sensitive skin with underlying diseases like atopic dermatitis or seborrheic dermatitis, non-foaming cleansers are useful. They can be applied on skin and then either wiped off or rinsed off.
6. Combination skin care regime that includes use of micellar water cleanser in morning, non-tinted cream with sunscreen in afternoon and serum in night can help in reduction of sensitivity and erythema in rosacea (Figs. 21.2 and 21.3) [23].

Fig. 21.2 Topical tretinoin induced sensitive skin

Fig. 21.3 Iatrosacea following topical steroid abuse

7. Skin care is needed in case of excess sun exposure, cold wind and sudden temperature variations. Most important triggering factors for sensitive skin after cosmetics are dry air, air conditioning, heat and wind [24].
8. Inorganic sunscreens like zinc oxide or titanium oxide are inert, non-sensitizing and non-irritant in nature and are preferred in sensitive skin [25, 26].
9. Individuals with sensitive skin should avoid use of chemical peelings with keratolytic or exfoliating agents as salicylic acid, retinols, resorcinol, trichloroacetic acid and alpha hydroxy acids like glycolic acid and lactic acid. They can precipitate the sensitivity or irritation of skin depending upon their formulation, pH, concentration and contact time [2, 27].
10. Rigorous post-operative care is needed after dermatosurgical procedures like ablative laser resurfacing, chemical peels, dermabrasion, micro needling, etc. as

Fig. 21.4 Erythematotelangiectatic rosacea on the nose showing telangiectasias and persistent erythema

they cause breach in continuity of skin and lead to sensitization and exacerbation of sensitive skin [5].

11. Patient counselling to be done for adequate and proper application of topical drugs with irritant or sensitivity potential. For example, tretinoin should be applied only on acne lesions with dab action in night only. Any rubbing or excess use may cause irritation and redness of skin (Fig. 21.4).
12. Topical corticosteroid abuse is very common in some countries, including India, due to their availability as over-the-counter drugs. Patients with various dermatological condition buy the steroid directly from chemist without visiting any dermatologist. This corticosteroid abuse leads to cutaneous changes like erythema, telangiectasia, photosensitivity, increased fragility and irritation of skin. Such skin is more prone for sensitization after use of cosmetics (Fig. 21.5) [7].
13. Specially formulated anti-ageing creams containing sodium salicylates (1%), polyhydroxy and bionic acids are preferred in sensitive skin in contrast to the standard use of salicylic acid and hydroxy acids, respectively [28, 29].

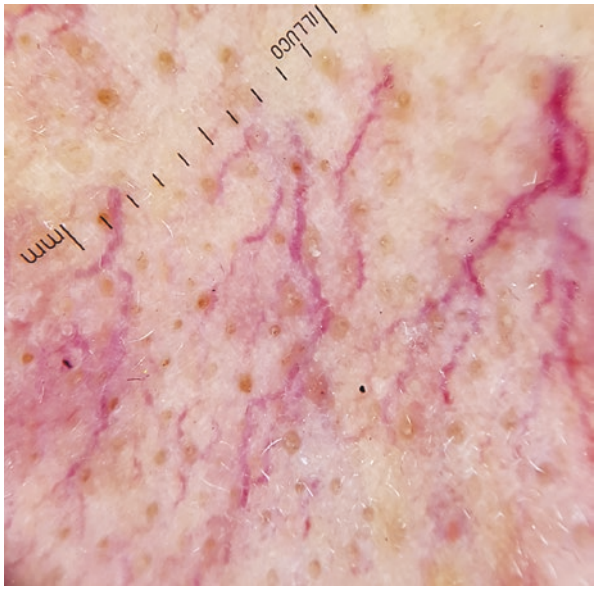

Fig. 21.5 Dermoscopy of the earlier patient with rosacea with a better demonstration of the network-like telangiectasias

Commonly used polyhydroxy acid in anti-ageing creams is gluconolactone. It also acts as antioxidant, moisturizer and repairs the skin barrier [29].

14. Benzoyl peroxide induced erythema and irritation can be reduced by gluconolactone-based formulations [29].
15. Bionic acids like lactobionic acid, cellobionic acid and maltobionic acid are hygroscopic in nature, so they form a gel like matrix with water at room temperature. This aqueous gel provides soothing and protecting effect on sensitive skin especially post dermatosurgical procedures like chemical peels and also inhibits further oxidative damage to skin [29].
16. Silicone-based gels can also be used for post-operative care and wound dressing after laser resurfacing [30].
17. Facial moisturizers containing niacinamide improve the skin barrier function, decrease trans-epidermal water loss, reduce inflammation and hydration of sensitive skin in rosacea [31].
18. Mild topical corticosteroids and topical calcineurin inhibitors can be used for brief duration for symptomatic treatment.
19. Topical crisaborole ointment (2%) can be used in sensitive skin to reduce symptoms. It acts as non-steroidal agent with anti-inflammatory and phosphodiesterase 4 inhibitor action [32, 33].
20. Elderly females may have sensitive skin of the vulva due to age-related structural and functional epidermal changes in genital skin. Secondly, hormonal changes may lead to dry and sensitive skin of genitalia [34]. Elderly women with urinary incontinence may also have sensitive skin of genitalia; however, they often ascribe the symptoms to their incontinent state [35].

21.6 Step 3: Repair the Disrupted Cutaneous Barrier—Moisturizers and Novel Formulations

1. Restoration of structural, chemical and physiological integrity of cutaneous barrier is necessary for resolution of sensitive skin. Products for repair of skin barrier should ideally contain bland cream-based moisturizers with humectants, occlusive and emollient properties, pH neutral or slightly acidic ingredients, additional microbiota with or without pre- or probiotics [17].
2. Moisturizers should be applied on the skin when it is still moist just after the pat drying. This helps in better maintaining the hydration of skin by locking the water in the skin.
3. White soft paraffin is inert and bland moisturizer but can lead to greasy or messy look.
4. Repeated application of moisturizers after exposure to air conditioning or change in temperature is advisable.
5. Moisturizers help in the restoration of damaged skin barrier function and homeostasis, maintain hydration, softness and repair the dry skin. So, they reduce the risk of irritation or onset of symptoms of sensitive skin.
6. Kinetin 0.1% lotion can be applied twice a day in rosacea for its moisturizing and skin repair functions [36].
7. Damaged skin barrier due to loss of intercellular lipids like fatty acids, cholesterol and ceramides can lead to increased trans-epidermal water loss, increased penetration of irritants and thus may lead to dry and sensitive skin [37].
8. Different types of moisturizers include humectants, emollients, occlusive and protein rejuvenators. Emollients help in replenishing the intercellular lipids like fatty acids (linoleic, lauric, oleic, stearic acids), cholesterol, ceramides, squalene and so, lead to restoration of barrier function and improve cell signalling. Thus, they help in reducing the symptoms of sensitive skin.
9. Essential fatty acids like alpha linolenic acids and linoleic acid help in maintaining the skin barrier intact and active.
10. Moisturizers that contain ceramides, cholesterol and fatty acid in the optimal ratio of 3:1:1 lead to faster restoration of skin barrier. They all are non-irritant in nature and help in replacing the lost natural ceramides of damaged skin. Natural ceramides are costly so synthetic pseudo-ceramides can be used [38].
11. Squalene is found in sebum secretions. Its saturated form is known as Squalane. Squalane is an odourless, anti-bacterial, non-comedogenic, non-irritant moisturizer safe for sensitive skin.
12. Various botanical substances can be added in moisturizers to enhance their efficiency like oatmeal, aloe, allantoin and flavonoids. Aloe vera has shown wound healing properties, acts as anti-inflammatory and anti-pruritic agent. Shea butter is obtained from *Vitellaria paradoxa* (formerly called *Butyrospermum parkii)* or shea tree kernel. Shea butter also has anti-inflammatory properties [37].

13. Oatmeal (*Avena sativa*) contains various phenols that possess antioxidant, anti-inflammatory properties. Other contents of oatmeal are protein, lipid, fibres, starch and beta glucans. Colloidal oatmeal is added in moisturizers and syndet bars to reduce the symptoms and sooth the sensitive skin. Colloidal oatmeal acts as potent hydrating and moisturizing agent for sensitive skin due to its high concentration of beta glucan and starch [37–39].
14. However, an eye should be kept out for any sensitive skin symptoms with these "natural" products.
15. Canola oil can help in reducing the inflammation and irritation caused by sodium lauryl sulphate.
16. Bakuchiol is a meroterpene extracted from the seed of *Psoralea corylifolia* or babchi herb. Bakuchiol acts via regulation of retinol-like gene expression in skin and so also leads to retinol-like anti-ageing effects. Recently, Draelos et al. demonstrate the effectiveness and safety of this natural bakuchiol-based anti-ageing moisturizer in sensitive skin [40].
17. A topical gel formulation containing nicotinamide, witch hazel, oat kernel extract and disodium lauriminodipropionate tocopheryl phosphates (DLTP) was found to be safe and effective in sensitive skin. It decreased the erythema and trans-epidermal water loss, and also induced in vitro new collagen formation. This formulation was also found to be non-comedogenic, non-irritating, non-sensitizing and non-stinging in nature [41].
18. Skin products containing 4-t-butylcyclohexanol provide calming and fast soothing effect on sensitive skin. 4-t-butylcyclohexanol decreases the sensory symptoms like burning, pricking, stinging of sensitive skin by counteracting the hyperresponsiveness of the nerve fibres by blocking the TRPV1 receptor [42, 43].
19. Licochalcone A is an anti-inflammatory agent, synthesized from the reversely constructed chalcone removed from *Glycyrrhiza inflata* species of licorice. Topical application of licochalcone A along with 4-t-butylcyclohexanol has shown to reduce erythema and stinging [43, 44].

21.7 Step 4: Restart of Cosmetics (If Needed) and Cosmetics for Sensitive Skin

1. Use of cosmetics should be avoided if possible or used in very minimal quantity for short duration.
2. Cosmetics with inert, hypoallergic, fragrance free, pure ingredients, specially formulated for sensitive skin should be used if at all needed.
3. Ingredients should be less than 10 in number so as to minimize the risk of sensitivity or irritation in sensitive skin.

4. Always check and highlight the date of expiry on skin care and cosmetic products. Post-dated products should be discarded at once to prevent any inadvertent use that can cause induction of symptoms of sensitive skin.
5. Water soluble cosmetics should be preferred over waterproof cosmetics as increased contact time with waterproof cosmetics may lead to irritation on skin. Also, they need specialized cleansing oils for removal [45].
6. Powder or mineral based cosmetics like powder foundation, talcum powder, eye shadow, blush, dry shampoo, etc. are preferred in sensitive skin. They contain talc, titanium dioxide, silicates or aluminium oxides that have no or minimal irritant or allergic potential. Secondly, these mineral-based products usually do not have additional ingredients like binders that can stuck to skin, so these are easily removable and doesn't last longer on skin. However, care must be taken to choose products with fewer number of ingredients, minimal to no fragrance, bland and no added colour, etc. [7]
7. Microfine zinc oxide or titanium oxide-based powder products are preferred for inert nature and added sun protection.
8. If powder-based or cream-based products are not available, then second preference is silicone (dimethicone, cyclomethicone) based products.
9. Dimethicone is water insoluble, non-comedogenic and hypoallergic. It also acts as emollient and makes skin soft to touch. So, it is used in facial foundation and oil free moisturizers [46].
10. For eye makeup, black coloured pencil eye liner and eyebrow pencil, black mascara should be preferred over the colour ones. Eye shadow should be light coloured.
11. After a washout period of 2 weeks, cosmetics can be incorporated back one by one in the chronological order of lipstick, face powder and blush [47]. If there is no sign of exacerbation or recurrence of sensitive skin after the use of newly added product, then that particular product can be continued.
12. Nail polish contains toluenesulfonamide-formaldehyde resin (TSFR) to increase their durability, adhesiveness and contrast. This allergen leads to allergic contact dermatitis and sensitivity of skin of face, lips, neck and in few cases periungual or perianal region. So, use of nail polish with TSFR should be avoided [48, 49].
13. Other newer potential allergens in nail polish are acrylates, especially the acrylic monomers, hydroxyethyl methacrylate, hydroxypropyl methacrylate, polyester resins and formaldehydes [50, 51].
14. Newer longer lasting nail polish like shellac, gel and porcelain nail lead to increased risk of allergic contact dermatitis and skin sensitivity [50, 51].
15. "Hypo-allergenic nail polish" available in market may also lead to allergic contact dermatitis due to presence of at least one of the potent allergens like epoxy resins, formaldehyde, sulfonamides, toluene or even TSFR. Hence, in sensitive skin individuals, nail polish is better avoided [52].
16. Fragrance free lipstick should be used.
17. Summers have been noted as a triggering factor for individuals with sensitive skin [53].

21.8 Emotional and Psychological Support

1. Individuals with sensitive or very sensitive skin may have impaired self-perception of social, physical and mental health. This psychological impairment in quality of life was found to be directly proportional to the degree of sensitivity of skin [53].
2. If the symptoms of sensitive skin persist even after the proper care of skin as advised, psychological aspect of sensitive skin should be assessed. Neuropsychiatric illnesses like anxiety, somatization, interpersonal sensitivity, hostility or depression may masquerade or present as hypersensitivity of skin. So, timely intervention may help the patient [54].
3. Differential diagnosis of body dysmorphic disorder should be kept in mind in cases where subjective symptoms of sensitive skin can't be explained or non-responsive to therapy.
4. In recurrent or recalcitrant cases of sensitive skin, psychological counselling may be needed.

21.9 The COVID-19 Pandemic and Care of Sensitive Skin

During the COVID-19 pandemic, frequent handwashing with soaps, frequent and liberal use of alcohol-based sanitizers and almost universal use of face masks have led to increase skin sensitivity and redness, dryness and irritation at the site of contact of skin with these personal protective equipment (PPE) items. Skin care during the COVID-19 pandemic thus would require judicious use of disinfectants and more frequent application of moisturizers. Some tips are as follows:

1. Use of mild skin cleanser with skin-friendly pH is recommended.
2. Regular use of moisturizers with humectant like urea and occlusive emollient like petroleum jelly are preferred to prevent dryness of skin and to keep skin well hydrated.
3. Hypoallergic and fragrance free products should be used to minimize the risk of sensitivity [55].
4. Anti-ageing creams may contain retinoids and further exacerbate skin irritation so they should be avoided. Use of moisturizer at bed time may be advised.
5. Overheated water should be avoided for baths and showers [56].
6. Alcohol-based hand sanitizers can cause hand dryness and erythema (Fig. 21.6), irritant or allergic contact dermatitis and urticaria. Alcohol-based hand sanitizers which contain at least 60% alcohol and no added surfactants, fragrances or preservatives are of low allergenic potential. An additional moisturizer in the alcohol-based sensitizers will further reduce the risk of hand dermatitis and sensitivity [57, 58].
7. Prolonged and repeated use of PPE may lead to exacerbation of pre-existing skin diseases.
8. Face mask should be of adequate fit and not too tight.

Fig. 21.6 Sensitive hands due to frequent handwashing during the COVID-19 pandemic

9. Skin reactions due to N95 masks are more common than surgical masks, due to the greater impermeability of N95 masks, a tighter fit and the different constituents [59]. Masks may cause skin sensitivity and irritation due to metal clips, rubber straps and adhesives among others [60]. In case of skin irritation due to mask, layering with gauze can help [56]. Also, different brand or material of face mask can be tried.
10. Before donning the mask at work, skin barrier wipes can be used to dry and clean face. Use of ample moisturizer 30 min prior to wearing the mask can help in keeping the facial skin supple and reduces the friction due to mask. However, petroleum-based moisturizers should be avoided as they may impede the integrity of N95 masks. Additionally, silicone cover protectors can also be used to prevent friction [60].
11. Disinfectant wipes meant for surface cleaning contain potent irritants like N-alkyl dimethyl benzyl ammonium chloride. Such wipes should not be used for hand-sanitizing as they may lead to skin sensitivity or irritant contact dermatitis [57].
12. The glove manufacturing process involves the use of rubber accelerators which can lead to skin sensitization and allergies [60]. Use of a different brand or material of gloves may help in such cases. Mild topical corticosteroid can be added for faster relief.

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