Diaper Dermatitis

- Print algorithm (page 714) and case (page 718)

Diaper Rash

- Urination: starts 24 hours after birth.
- Frequency: 20 times until 2 months old. Then 8 times until 8 months old.
- Defecation: 3-6 times until 8 months of age, then as the infant's autonomic and muscular control develops, defecation gradually declines to 1 to 3 times a day.
- In the first months of life, it is common for infants to have 6 changes of diaper per day.

- Diaper rash is :An inflammatory condition in the region of the perineum, buttocks, lower abdomen and inner thighs

Diaper rash may begin as intensely red patches beneath the diaper

A.D.A.M.

Epidemiology-I

- Vast majority: infants who are still in diapers
- 70% : as early as 7 days old
- 2/3 of infants: symptoms at some time of their infancy
- The number of cases have declined since 1970 **(WHY?)**

Epidemiology-2

- Breast-fed vs. bottle-fed infants:???
- The effect of diet on diaper rash???
- Diaper rash can be a manifestation of other diseases (e.g. kawasaki's syndrome, granuloma gluteale infantum, CMV)
- Infants born to compromised mothers (HIV+ve, genital herpes, STD)→ at risk of unusual manifestations of diaper rash or-like presentations.

What causes diaper rash?

A combination of factors:

- Occlusion,
- moisture,
- bacteria,
- a shift away from the normal acidic skin pH (4.0-5.5) to a more alkaline pH
- Mechanical friction
- Proteolytic enzymes and bile salts from GIT
- Reusable diapers- harsh chemicals
- Medications

What causes diaper rash?

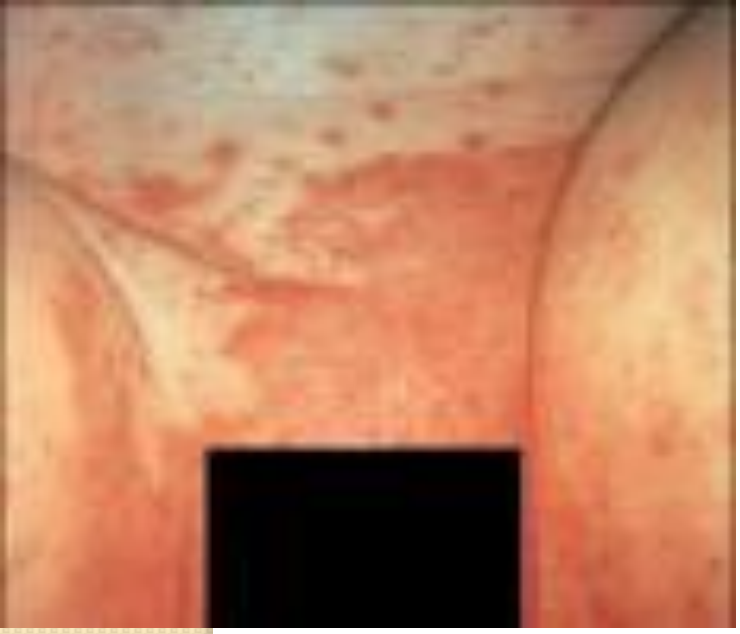
- Urea-splitting bacteria from the colon→ urine to ammonia (1) raise pH (2) produce a serious chemical burn
- Mechanical irritation can be an initial insult that breaks down the epidermis, allowing other irritants to assault the skin
- *Tight fitting, stiff or rough diapers and the use of occlusive plastic or rubberized covers or pants over the diaper can contribute to occlusion and mechanical friction of the skin*
- *Infrequent changing of the diaper contributes to increased skin moisture. Skin left in contact with wetness for long periods becomes waterlogged or hyperhydrated, which plugs sweat glands and makes skin more susceptible to irritation and the absorption of chemicals.*

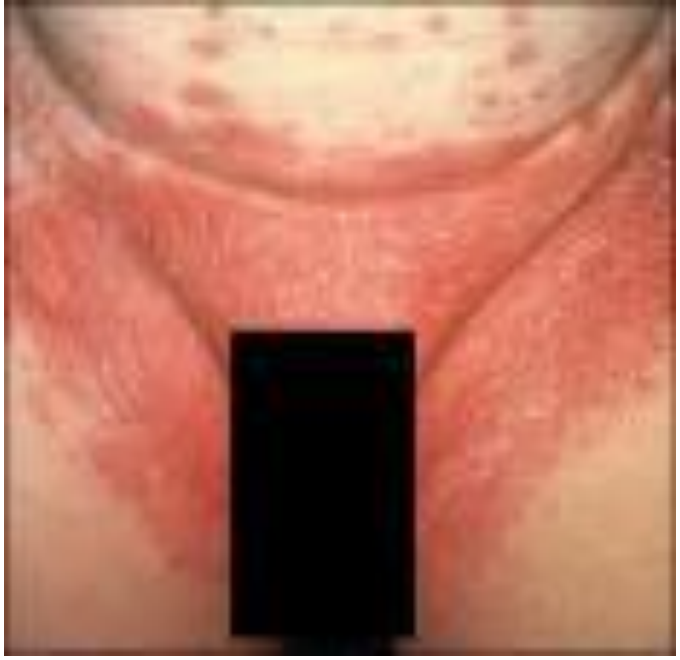
Pathophysiology

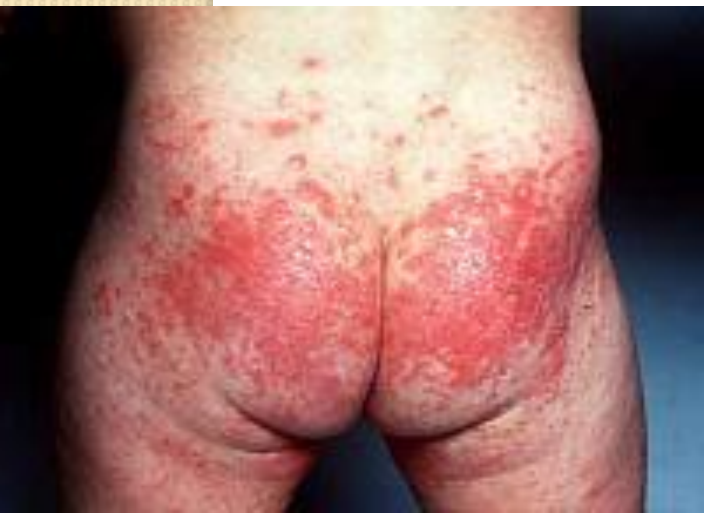
- Skin of infant at perineal region is ½-1/3 of thickness of adult skin
- Little exposure to outside environment
- Tends to hold moisture and wetness→ irritation and infection
- Also: less effective barrier to absorption of drugs and toxins

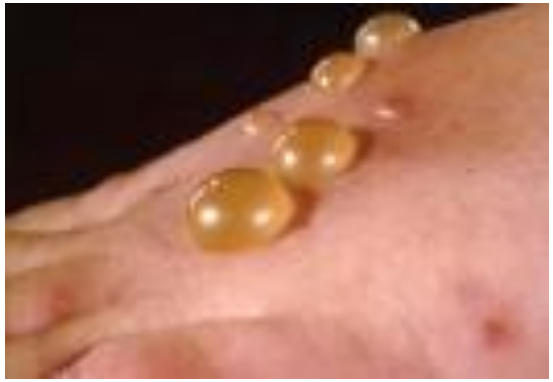
Signs and Symptoms

- **Mild:** red, bright red (erythematous) sometimes shiny wet looking patches
- **Severe:** maceration, papule, vesicles or bullae, oozing, erosion or ulceration
- Occur in a matter of hours and take days or weeks to resolve









Complications

1. Secondary infections and genital damage
- Bacterial, fungal or viral
- May progress to skin maceration, ulceration, infection of the penis or vulva itself and UTI
- If untreated: adhesions and scarring of genitals can occur→ cosmetic or reconstructive surgery

2. Exist concurrently with psoriasis or seborrhea

Treatment of Diaper rash

Treatment Goals:

1. Relieve the symptoms
2. Rid the patient of the rash
3. Prevent recurrences

The best treatment of diaper rash is

PREVENTION

General Treatment Approach

- The best treatment of diaper rash is prevention

→ Frequent changing of diaper

- Realistic therapy: uses both prevention and treatment
- Self treatment limited only to uncomplicated, mild to moderate
- Frequent changing→ impractical (24 hr vigil and a way tp exactly when the infant has urinated or defecated)

Diaper Change

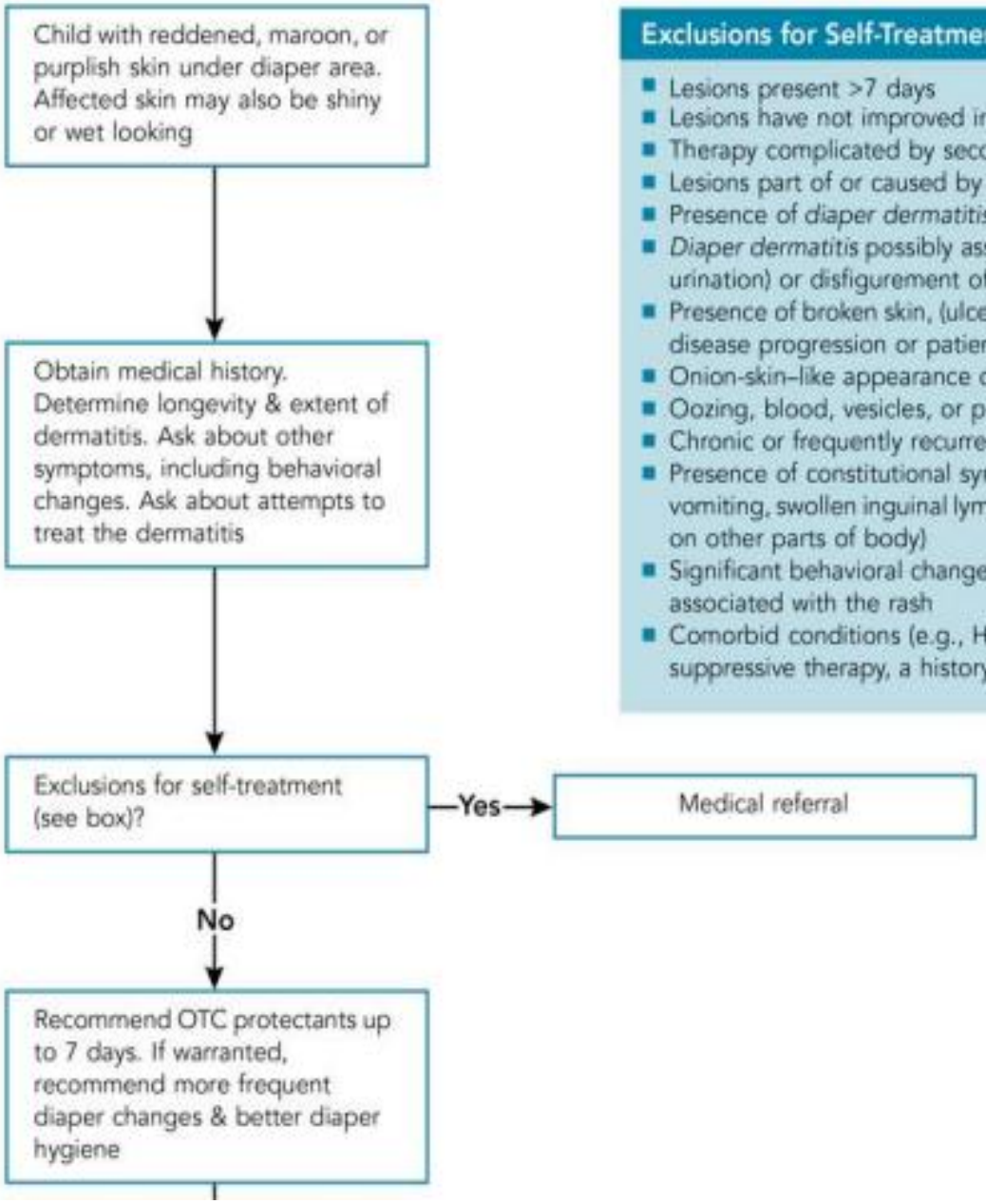
Non-pharmacologic Therapy

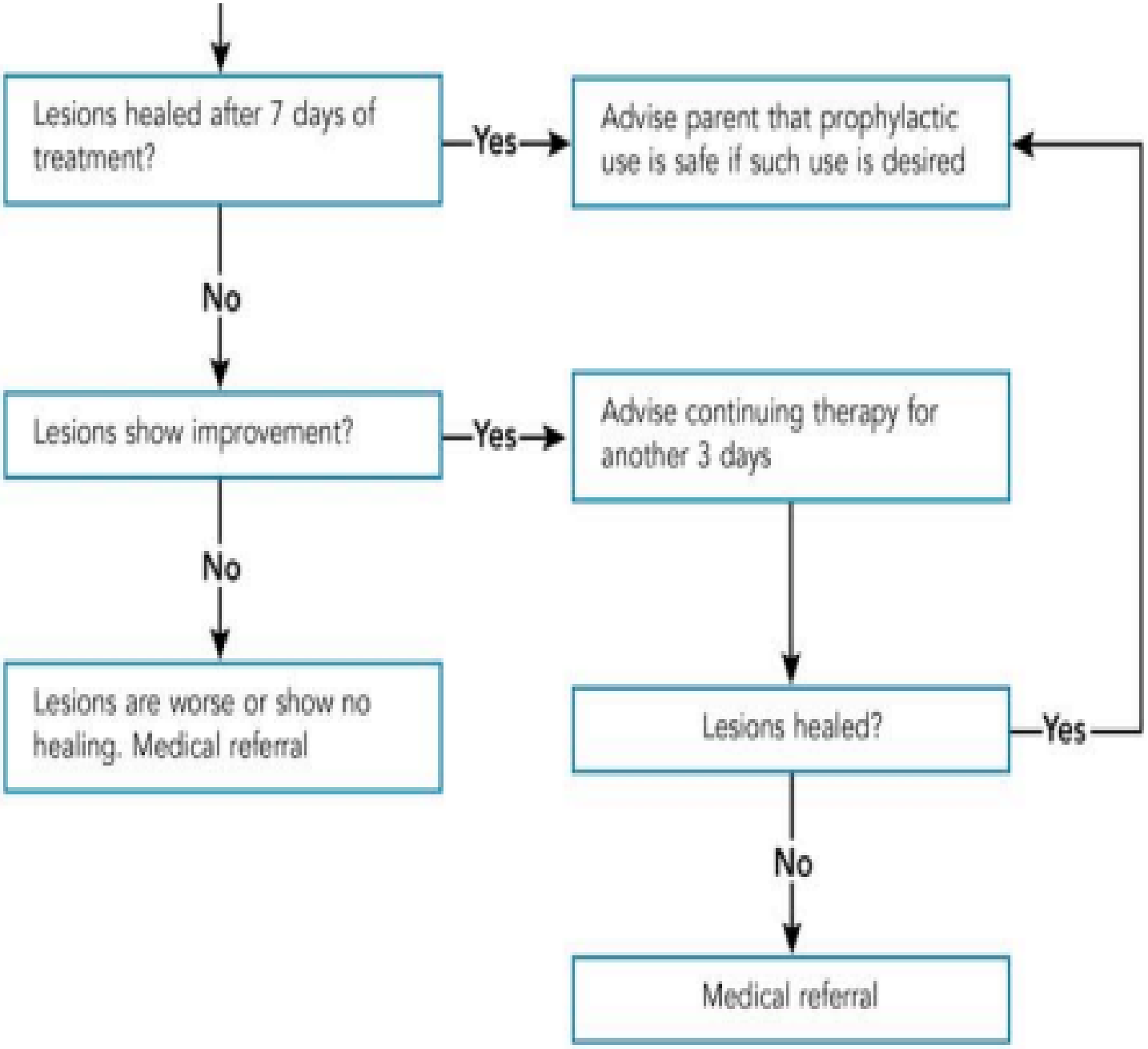
Steps:

- Reduce occlusion
- Reduce contact time of urine and feces with skin
- Reduce mechanical irritation and trauma to the inguinal and perineal skin
- Protect the skin from further irritation
- Encourage healing
- Discourage onset of secondary infection

Diaper Change

- Frequency: six is optimum
- Careful flushing of the skin (1. A shower sprayer- low power, 2. Holding infant in sitting position-not recommended), 3. Holding a child over a sink- better
- Nonfriction drying (1. Air-dry and run naked-not recommended, 2. Hair dryer)
- Use of commercial baby wipes (?)


Child with reddened, maroon, or purplish skin under diaper area. Affected skin may also be shiny or wet looking
Obtain medical history. Determine longevity & extent of dermatitis. Ask about other symptoms, including behavioral changes. Ask about attempts to treat the dermatitis
Exclusions for self-treatment (see box)?
Yes
Medical referral
No
Recommend OTC protectants up to 7 days. If warranted, recommend more frequent diaper changes & better diaper hygiene
Exclusions for Self-Treatment of Diaper Dermatitis and Prickly Heat
Lesions present >7 days
Lesions have not improved in 7 days despite appropriate care
Therapy complicated by secondary infection (viral, bacterial, or fungal)
Lesions part of or caused by another disease state
Presence of diaper dermatitis outside diaper region
Diaper dermatitis possibly associated with urinary tract infection (painful urination) or disfigurement of penis or vulva
Presence of broken skin, (ulceration, blistering, or peeling of skin) due to disease progression or patient action (e.g., scratching)
Onion-skin–like appearance or bulla formation in affected area
Oozing, blood, vesicles, or pus at lesion sites
Chronic or frequently recurrent lesions
Presence of constitutional symptoms (e.g., fever, diarrhea, nausea, vomiting, swollen inguinal lymph nodes, rapid pulse or rash or skin lesions on other parts of body)
Significant behavioral changes in patient (e.g., lethargy, incessant crying) associated with the rash
Comorbid conditions (e.g., HIV, organ transplantation, immune suppressive therapy, a history of dermal hepatic infections)


Lesions healed after 7 days of treatment?
Yes
Advise parent that prophylactic use is safe if such use is desired
No
Lesions show improvement?
Yes
Advise continuing therapy for another 3 days
No
Lesions are worse or show no healing. Medical referral
Lesions healed?
Yes
No
Medical referral

Pharmacologic Therapy

Steps:

1. Clean and dry the skin
2. Protect the skin from further contact with urine and feces
3. Soothe any discomfort caused by the lesion
4. Encourage healing
5. Discourage the onset of secondary infection

- **Skin protectants** are the only products considered safe and effective for use in diaper rash without supervision by a primary care provider
- Skin protectants are remarkably safe. They can be used either for prophylaxis or treatment.
- *An infant with no diaper rash symptoms should not be needlessly exposed to diaper rash products unless a diaper rash is anticipated based on previous history. (e.g. diaper rash occurred during a previous episode of diarrhea or while the infant was on antibiotic therapy). In such cases, preventative therapy is reasonable.*
- Combination (?)
- Products containing antimicrobials, external analgesics, and antifungals cannot legally claim they are for treatment of diaper rash

Skin Protectants approved to treat diaper rash

Agent	Concentration (%)
Allantoin	0.5-2.0
Calamine	1-25
Cod liver oil (in combination)	5.0-13.5
Dimethicone	1-3
Kaolin	4-20
Lanolin (in combination)	15.5
Mineral oil	50-100
Petrolatum	30-100
Talc	45-100
Topical cornstarch	10-98
White petrolatum	30-100
Zinc oxide	1-25
Zinc oxide ointment	25-40


It begins
THIS DIAPER MAKES MY BUTT LOOK BIG...
P. BYRNES

Skin Protectants

How do they act?

- **The protective effects of these products allow the body's normal healing processes to work.**
- **They are generally removed and reapplied with each diaper change.**
- Serve as physical barrier between the skin and external irritants. BY preventing further insult and aggravation, they protect surfaces that are healing
- Protectants serve as lubricants in areas of skin-to-skin or skin-to-diaper friction
- *Protectants absorb moisture or prevent moisture from coming into direct contact with the skin.*

Zinc oxide

- Mild astringent with minor antiseptic properties
- Powder, paste (up to 25%) or ointment (1-40%)
- The major drawback of zinc oxide paste: thick and tacky to the touch. Removal form the skin requires wiping with mineral oil
- New formulations of zinc oxide: less difficult to use, more washable, more creamlike, and easier to apply and remove

Ingredient	% (w/w)	properties
Excipients	79.2%	water-repellent base
Zinc oxide, EP	15.25%	astringent, soothing, protective
Lanolin (hypoallergenic)	4.00%	emollient
Benzyl benzoate, BP	1.01%	pesticide
Benzyl alcohol, BP	0.39%	mild anesthetic, disinfectant
Benzyl cinnamate	0.15%	antibacterial, antifungal

Calamine

- A mixture of zinc and ferrous oxides
- Has absorption properties
- mild astringent and protective agent for skin disorders
- Numerous dosage forms

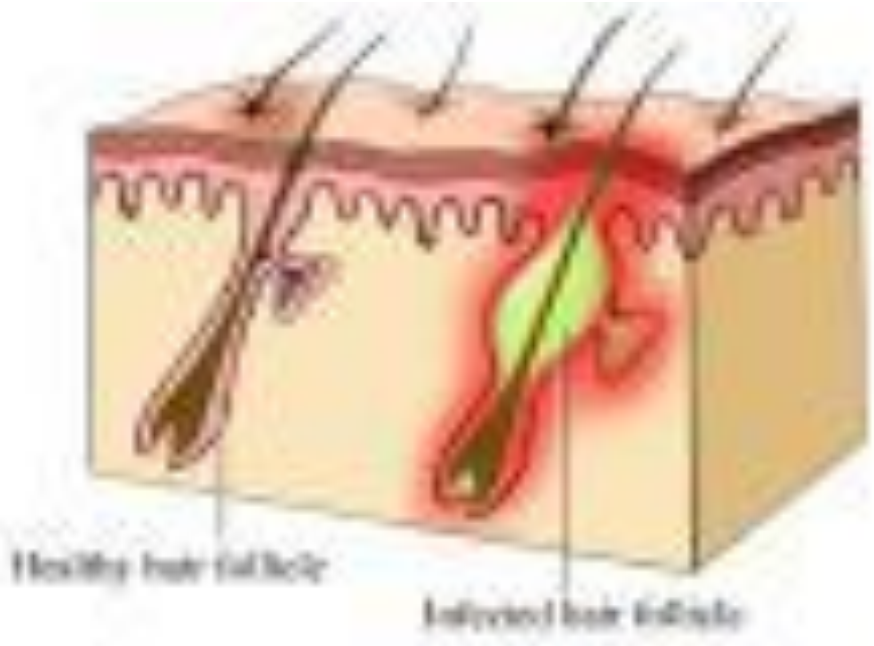
Allantoin

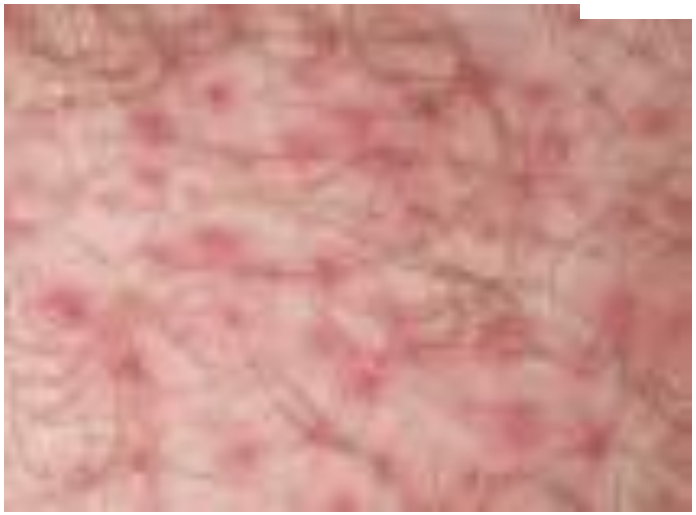
- Rarely seen as a single entity product
- A purine that *complexes with and renders harmless many sensitizing agents on the skin.*

Mineral oil

- It coats the skin with a water-impenetrable film

- *It must be washed off with each diaper change to avoid buildup in pores and* ***subsequent folliculitis***





Lanolin (*Wool Fat*):

- proposed for use *only in combination with other ingredients.*
- *By itself, lanolin is very tacky and difficult to wash off.*
- Some people are allergic to lanolin
- It should not appear in products at more than 20% concentration

Petrolatum (*Petroleum Jelly*):

- yellow oleaginous hydrocarbon, when decolorized→ white petrolatum.
- Either form is an excellent protectant and ubiquitous ointment base
- Plain white petrolatum or a white petrolatum combined with mineral oil and wax is superior to all other product choices for newborns with uncomplicated diaper dermatitis.

- **Kaolin**: a claylike material of hydrated aluminum silicate. It is mined from earth and then highly purified. Absorbs moisture and perspiration.
- **Cod liver oil:** a protectant oil that is rich in vitamin A.
- **Dimethicone:** a silicone-based oil that repels water and soothes and counteracts inflammation

Dimethicone containing products

Petroleum

- **Talc and topical cornstarch:** almost exclusively used as loose powders
- **Talc:** finely milled form of hydrous magnesium silicate
- More of a lubricant than absorbent
- **Reduces friction between body parts; thighs, buttocks, and inguinal area skin folds**
- *Adheres well to the skin but should never be applied to broken or oozing skin* ***(WHY?)***
- Because it can cake on the edges of wounds and cause infection or retard healing.
- Inhalation warning


Johnson's
baby

- **Cornstarch:** derived from the grain heads of corn plants
- Effective as an absorbent
- Sometimes combined with other ingredients: Mg stearate, $CaCO_3$, Zn stearate, microporous cellulose, skin-soothing agents
- Fragrance maybe added

Contraindicated Agents

- Topical antibacterial and antifungal: not appropriate for diaper rash
- *External analgesics: alter sensory perceptions and may retard healing or further complicate diaper rash.*
- *Avoid products containing Boric acid or baking soda ($NaHCO_3$) → toxicity*
- Hydrocortisone (?)

Hydrocortisone

- Indicated for minor skin irritation but should never be used in diaper rash without the supervision of a primary care provider
- *OTC HC is labeled not to be used in patients younger than 2 years old.*
- **Contraindication especially true in infants**

1. *Suppress local immune response*
2. The diaper is a significant portion of the infant's body surface area (*When applied to macerated skin or a large surface area, absorption of HC may lead to blood levels that interfere with the pituitary-adrenal axis of the infant)*

Complementary Therapies

- Products containing *aloe vera, witch hazel, tea tree oil, goldenseal and Melissa are not recommended for use in newborns and infants for several reasons*
- Not enough is known about their safety and effectiveness in infant skin or upon systemic absorption
- What concentration should be used is not known

Patient Education-

Nonprescription Medications

1. *The skin protectant (from dictionary) can be used even after the rash clears to prevent recurrences, but use should be stopped for short periods to see whether the rash returns and the product is still needed*
2. Do not use products that contain ingredients from the table if combined with benzocaine or an antibacterial (e.g. benzethonium chloride)

Patient Education-

Nonprescription Medications

3. If you use hydrocortisone, this should be done for a very short period of time (i.e. until redness fades away)
4. Do not use external analgesics such as phenol, menthol, methyl salicylate, or capsaicin
5. Powders should be gently poured into the hands and then rubbed onto the skin, using a sufficient amount to cover the affected area. Never shake vigorously near infants.

Patient Education-

Nonprescription Medications

6. If necessary, semisolid products can be applied with disposable tongue depressors, rubber gloves or washable rubber spatulas
7. Apply sufficient cream or ointment, by hand or with a disposable or washable spatula, to cover the affected area
8. If using mineral oil, wash it at every change to avoid clogging the pores → prickly heat or folliculitis

Patient Education-

Nonprescription Medications

9. Do not apply products containing talc powder to broken or oozing skin because it can cake on the edges of the wounds and lead to infection or retard healing
10. Discard products that are discolored or whose expiration date has passed

Evaluation of patient outcome

- Treatment of diaper rash should be relatively short , approximately one week.
- *If 7 days have elapsed and the condition is improved but not healed , therapy should be continued for another 3 days or until complete healing has occurred*
- If the condition has not improved or has worsened after 7 days of treatment, medical referral should occur