In the name of God

Approach to the child with *Pediculosis Capitis*

focus on the treatment

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Introduction

Pediculosis capitis **IMPORTANT Disease in** Pediatric Dermatology

- It is one of the **most common ectoparasitic** infestations
- **Children**, in the age group of **5-13 years** are the usual victims. (Less 10% to above 40%)
- May result in substantial **social distress**, **parental anxiety**, **embarrassment to the child**, and unnecessary absence from school and work.

Transmission

- 1- **Head - to - head contact**

- 2- The role of **fomites** such as shared **hats and combs** lice may survive for several days off the human body)

Epidemiology

- A **higher incidence** of nits in the hair of **girls** may be explained by increased susceptibility to head lice as a result of **longer hair and closer head - to - head** contact with their peers.
- Alternatively, it may be attributed to more **frequent cutting** of **boys** ' hair, which removes evidence of previous infestations.
- **Adolescents and adults are less commonly** affected than children.
- Adult males appear to be less susceptible than women .

All socioeconomic groups are affected

Present By: *Dr. Bahareh Abtahi-Naeini*

Clinical features

The human host is not usually aware of lice feeding on the skin surface, although a **slight stinging or pricking sensation** may result.

Initial infestation with lice usually remains **asymptomatic for several weeks**

Clinical features

- The **main symptom** of head lice infestation is **pruritus**. The degree of pruritus is variable and it can be completely absent in the early days or weeks of infestation.

(sensitization to the saliva and faecal material of the louse)

- Persistent scratching and excoriation of the scalp may result in **secondary bacterial infection and posterior cervical lymphadenopathy**.
- In children with long hair, **bite reactions** may sometimes be seen on the back and sides of the neck.

  Extensive infestation may result in **constitutional symptoms** such as mild fever and malaise.

Clinical manifestations

Persistent itching : **lichenification**, eczematous reactions on the nape and side of the neck.

Haemorrhagic crusts when present indicate that a louse has taken a recent blood meal.

Nits are seen firmly attached to hair shaft and tend to prefer the **occipital (‘louse pit’)** and **temporal regions** .

Nits found close to the hair shaft are viable, whereas nits found on distal hair parts represent empty or nonviable egg cases.

Clinical features

Nits found several centimetres along the hair shaft are more likely to be empty egg cases or non - viable ova than thos found close to the scalp

complications

- Fever, malaise
- Lymphadenopathy (posterior cervical, postauricular and occipital)
- Irritability
- Iron deficiency anemia among schoolchildren
- Patches of sparse hair or alopecia (persistent itching and scratching, which can traumatize the hair)
- severe pyoderma of the scalp (cicatricial alopecia)
- The eyelashes are not affected by head lice.

complications

Autosensitization Dermatitis to pediculosis occurs

(***Pediculid***)

Maculopapular rash on face, trunk and extremities.

- **Live adult insects are often not seen** on clinical examination.
- Most children have few live adults (1 – 10 lice) on their heads
- These are **difficult to detect clinically** because

1- They are **translucent in colour** (unless they have had a recent blood meal)

2- Tend to **hide from bright light**.

Heavy infestation (50–100 organisms)

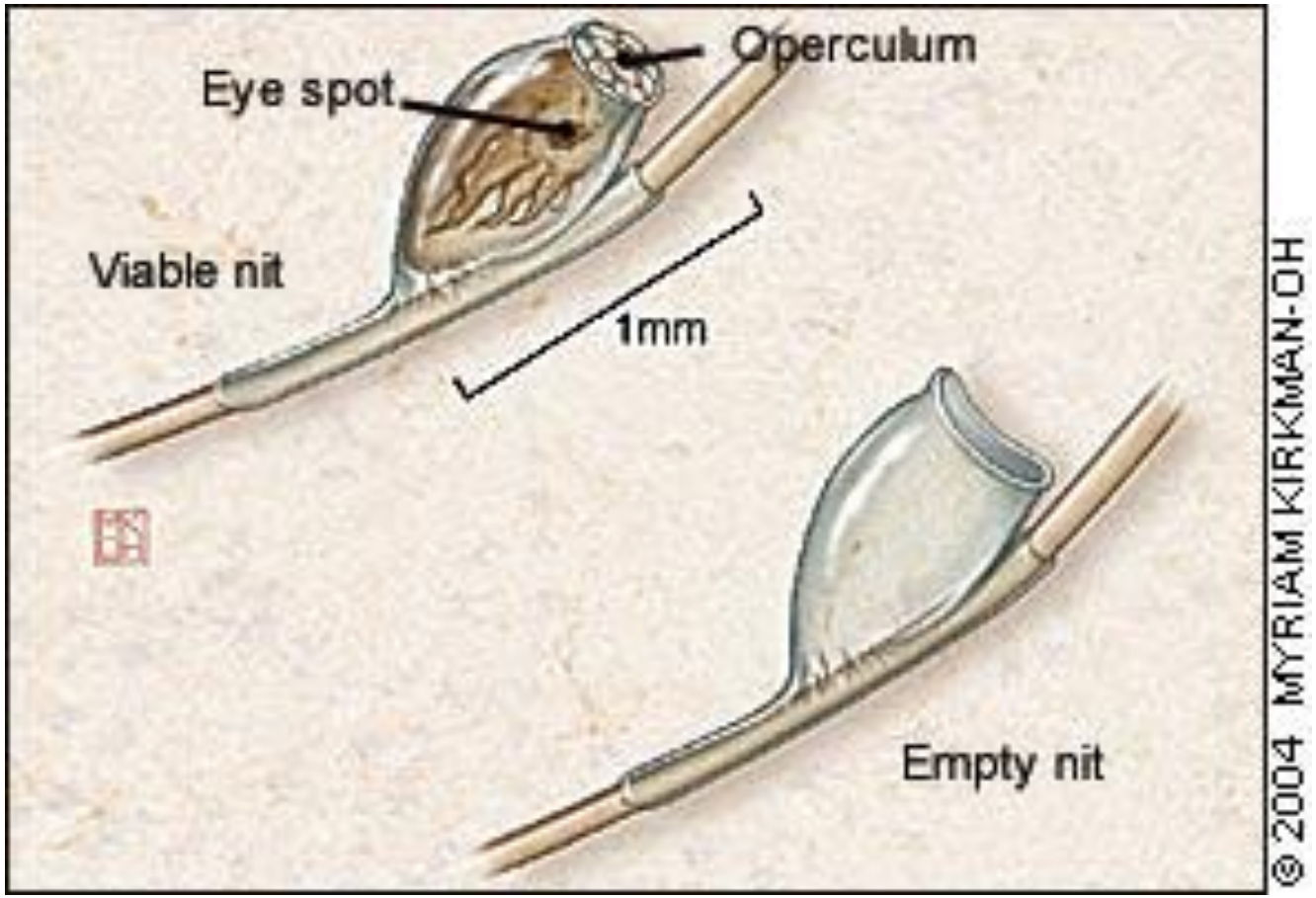
Plica polonica: matting of hairs with nits and exudates.

Diagnosis

- The diagnosis of lice infestation is made by **visual inspection**. The presence of **live lice** is confirmatory but they can be hard to find .
- Their detection may be facilitated by combing with a specially designed comb or by the **wet - combing** method.

Nits on direct microscopy

Tan-brown, translucent masses attached to the hair shaft



Nits on direct Dermoscopy

Grey, translucent and **ovoid**
firmly attached to the hair shaft

pseudonits are fine, **white, amorphous cylindrical** structures made of keratin of Variable sizes.
Pseudonits can be easily moved along the hair length.

Figure 1. Dermoscopy: gray, translucent, ovoid eggs, firmly attached to the hair shaft, corresponding to nits.

Sara : 3 Y/O – 13 kg

Dara: 7 Y/O – 20 Kg

Tara : 5 Mon – 5 kg

MOM: PREGNANT

DAD: HX Seizure

3 Times use of Permethrin :10 min

MOM : Myonez


Rx
Ivermectin Tablets
IVERCAM-12
Tablets
10x10 Tablets

Treatment

- **Choice of a treatment** modality for pediculosis should be made considering **safety**, **efficacy, local pattern of resistance, and cost.**

General therapy

1. Mechanical removal of nits
2. Wet combing
3. Hot hair treatment (LouseBuster™)
4. Disinfection of surrounding household environment
5. Treatment of household contacts

General therapy

Topical therapy

1. Permethrin 1% cream
2. Permethrin 5% cream
3. Synergized natural pyrethrins such as piperonyl butoxide (0.33% shampoo)
4. Malathion lotion 0.5%
5. Carbaryl shampoo (0.5%)
6. Lindane 1% shampoo
7. Benzyl alcohol 5% lotion
8. Ivermectin 1% lotion
9. 9.Spinosad 0.9% cream

Topical therapy

Systemic therapy

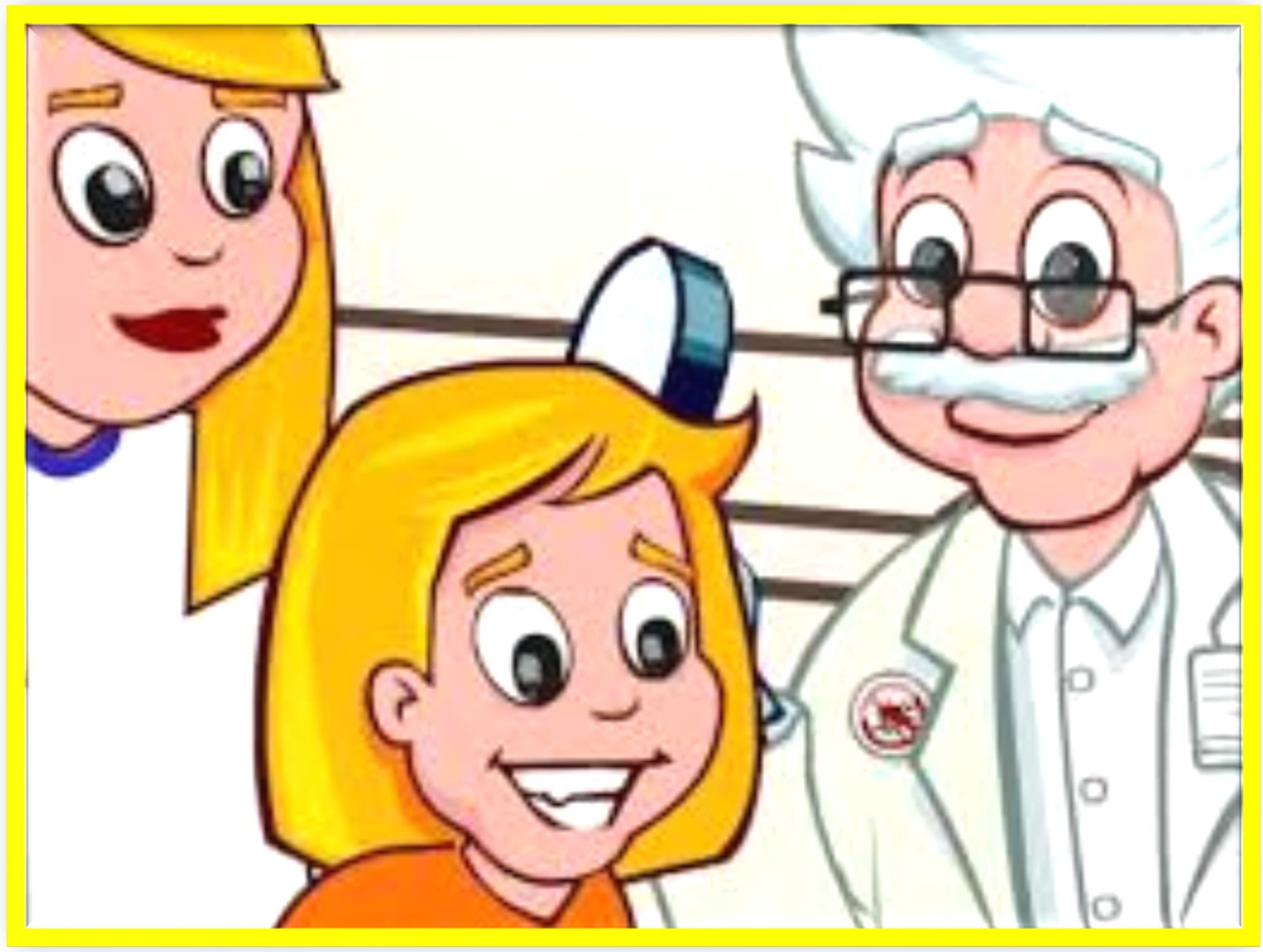
1. Ivermectin
2. Albendazole
3. Levamisole
4. Co-trimoxazole (conflicting data exist regarding its efficacy)
5. Oral antibiotics for secondary infection
6. Oral antihistamines

Systemic therapy

Alternative therapy

1. Hexane flower bud extract (*Syzygium aromaticum*)
2. Silicone–oil complex as asphyxiants
3. Galenic metaemulsion
4. Dimeticone 4% lotion
5. Essential oils
6. Occlusive agents (petroleum jelly)

Alternative therapy



Treatment (Historically)

1-Removed by hand,

2-Shaving affected areas,

3-Physical removal (

Wet combing involves moistening the hair and combing the hair root-to-tip with a lice comb)

Cure rates vary widely with this method.

Topical therapy

1. Permethrin 1% cream
2. Permethrin 5% cream
3. Synergized natural pyrethrins such as piperonyl butoxide (0.33% shampoo)
4. Malathion lotion 0.5%
5. Carbaryl shampoo (0.5%)
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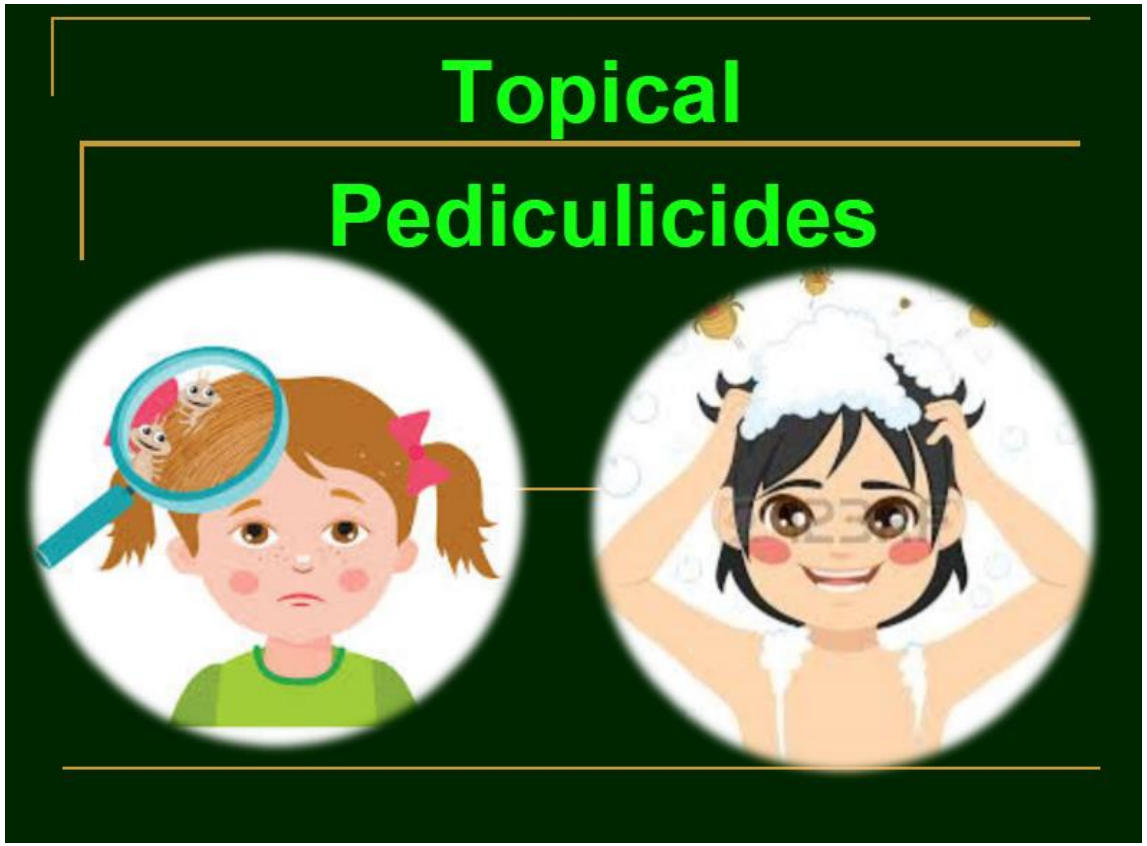
8. Ivermectin 1% lotion
9. 9.Spinosad 0.9% cream



Treatment of Head lice

- Pharmacologic treatment (Pediculocides) on two mechanisms:
  - Neurotoxicity resulting in paralysis nervous system of the of the louse *(Pediculocides)*
  - Suffocation of the louse from topical application.

Over view Treatment

- **Topical pediculocides** have been the **standard treatment** for head lice in countries where people can afford them.
- It is important to recognize that available treatments kill lice but **do not reliably destroy eggs**.
- **Repeat treatment** is sometimes required for complete eradication. A second treatment **7 to 10 days** after the initial treatment is typically sufficient to eradicate most nonresistant lice.

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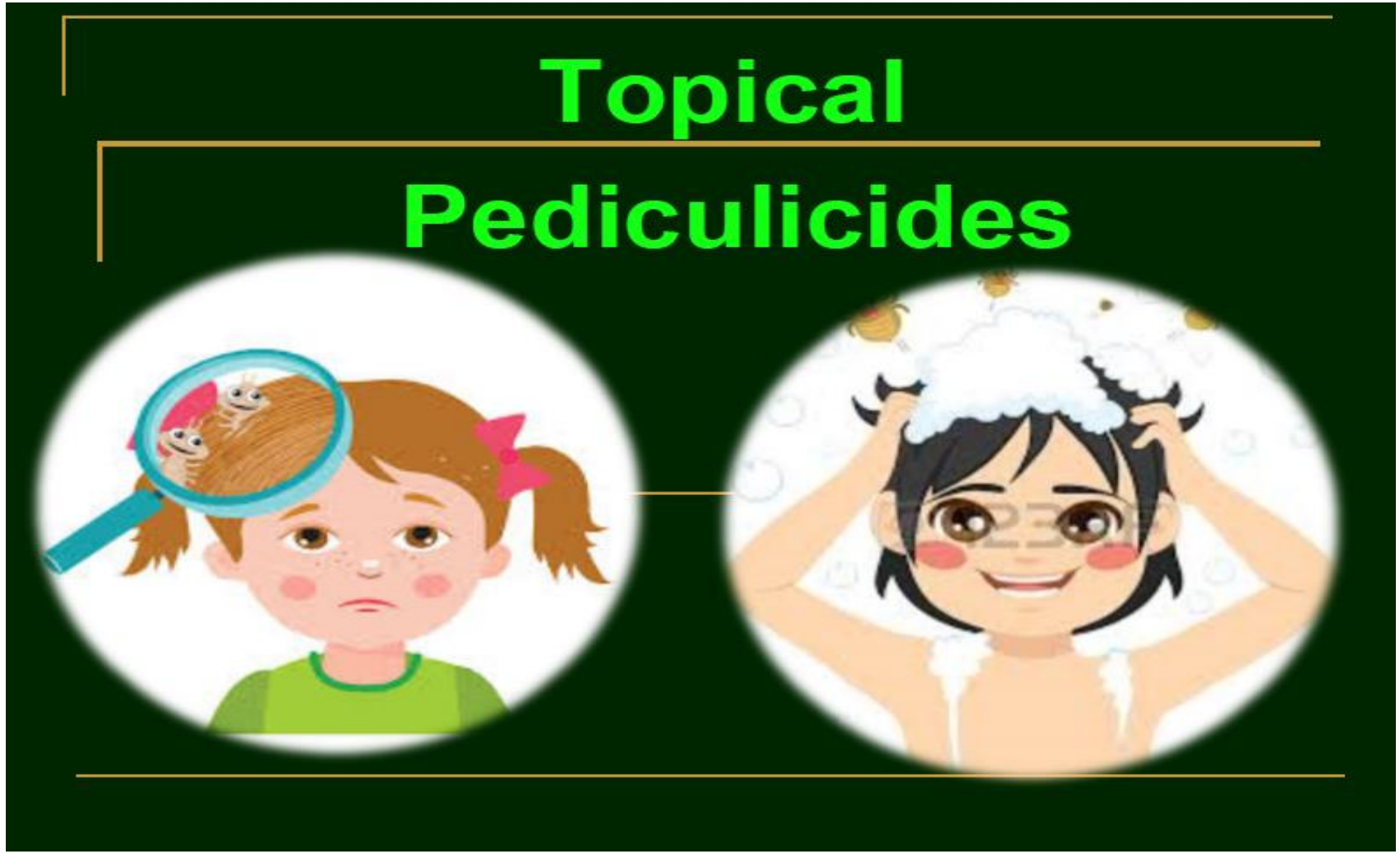
Permethrin 1%



Permethrin 1%

- ✓Synthetic Pyrethroid : photostable
- ✓variable ovicidal activity
- ✓**Safety profile with low toxicity**
- ✓It is a favorable **first-line agent.**

- ✓It is applied to damp hair that is first shampooed with a non-conditioning shampoo and then towel dried.

- ✓It is left on for **10 min** and then rinsed off

درمان شپش موی سر با شامپو پرمترین

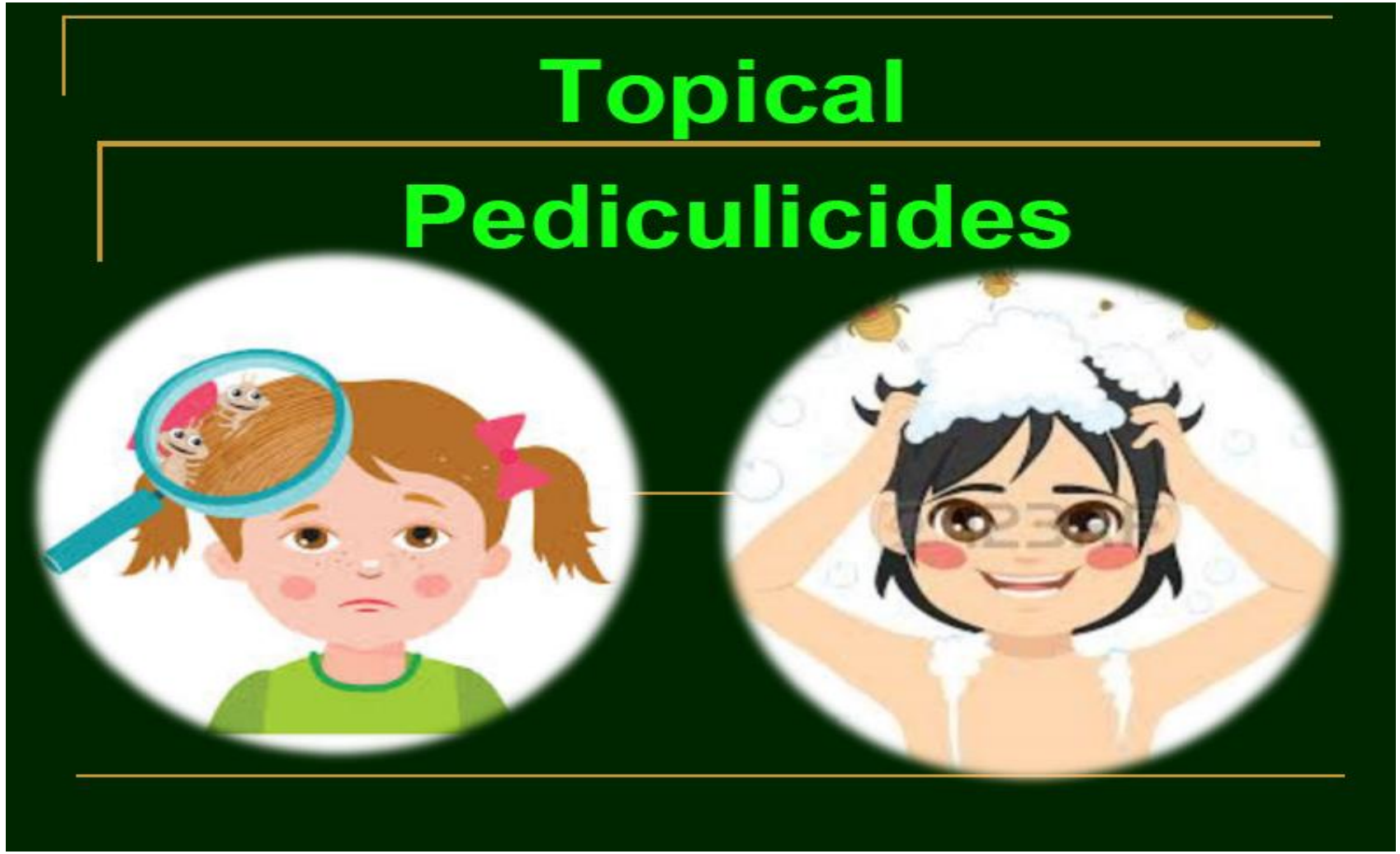
Permethrin 1%

- Permethrin **leaves a residue on the hair (for 3 weeks)** that is designed to kill nymphs emerging from 20% to 30% of the eggs not killed with the first application.
- Conditioners and silicone-based additives present in almost all currently available shampoos impair permethrin adherence to the hair shaft and reduce its residual effect. Therefore, the application needs to be repeated in 7-10 days, if live lice are seen.
- Some **residual effect against** re-infestation
  - **Recent recommendations suggest a re-treatment, preferably on 10th day**
  - **An alternate treatment schedule on days 0, 7, and 13-15 has been proposed.**

SAFETY : Permethrin 1%

- FDA pregnancy category : **B**
- FDA approved for infants more than 2 months of age
- Side effect : Pruritus, erythema, and edema are its usual side effects

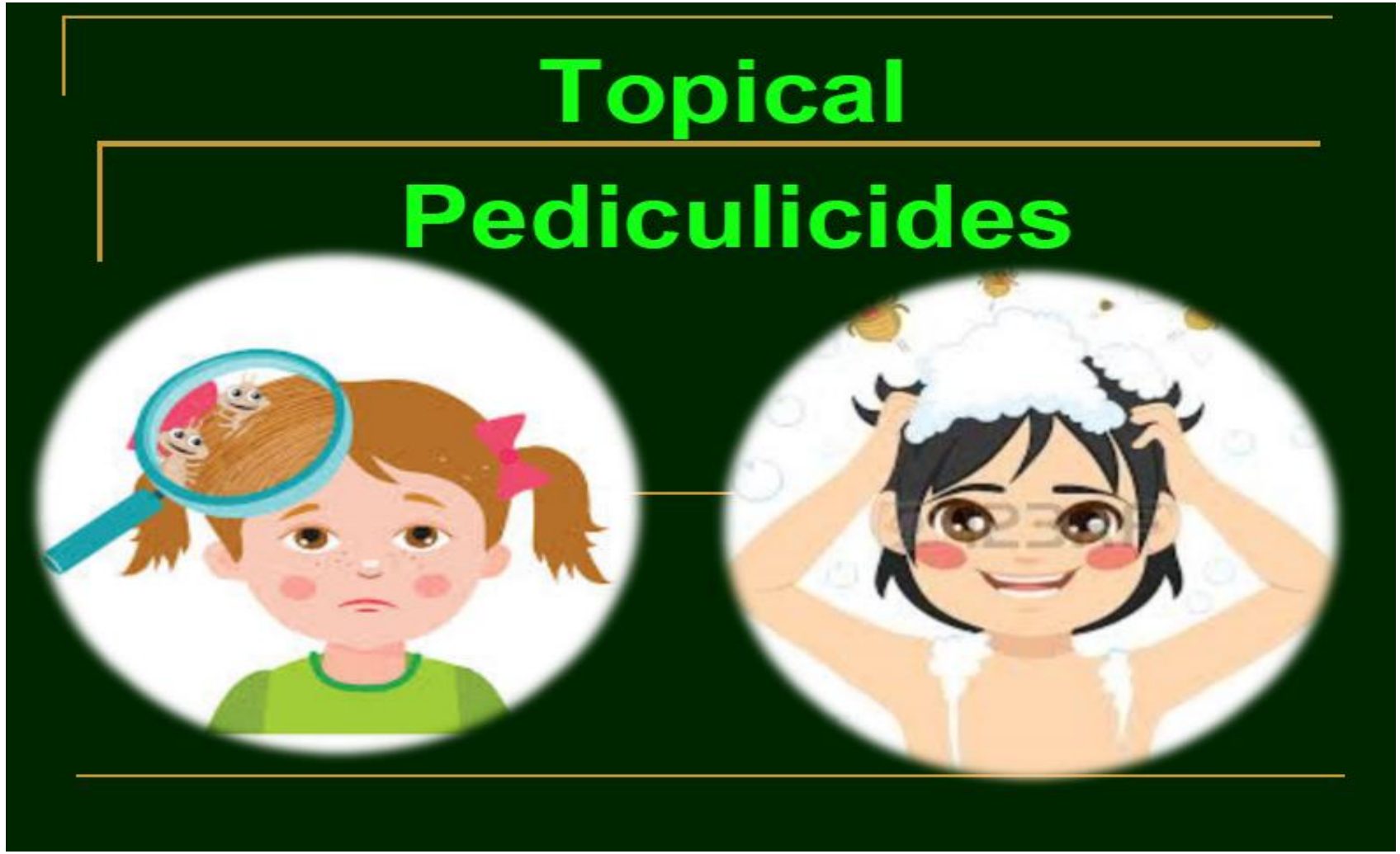
Permethrin 5%



Permethrin 5% Cream

- It has **anecdotally** been recommended for the treatment of head lice that seem to be recalcitrant to other treatments.
- The results of one study suggested that lice resistant to 1% permethrin will not succumb to higher concentrations.
- Permethrin 5% is **not currently approved** **for use as a pediculicide**.

Lindane 1 %



Lindane 1% Shampoo

- γ- benzene hexachloride
- An organochloride(kills lice by respiratory paralysis)

- low ovicidal activity (30-50% of eggs are not killed)

- Topical application for **4 minutes** to clean, dry hair, then add water to lather **and rinse** .
- Its **reapplication** should be in **9-10 days**

Lindane 1% Shampoo

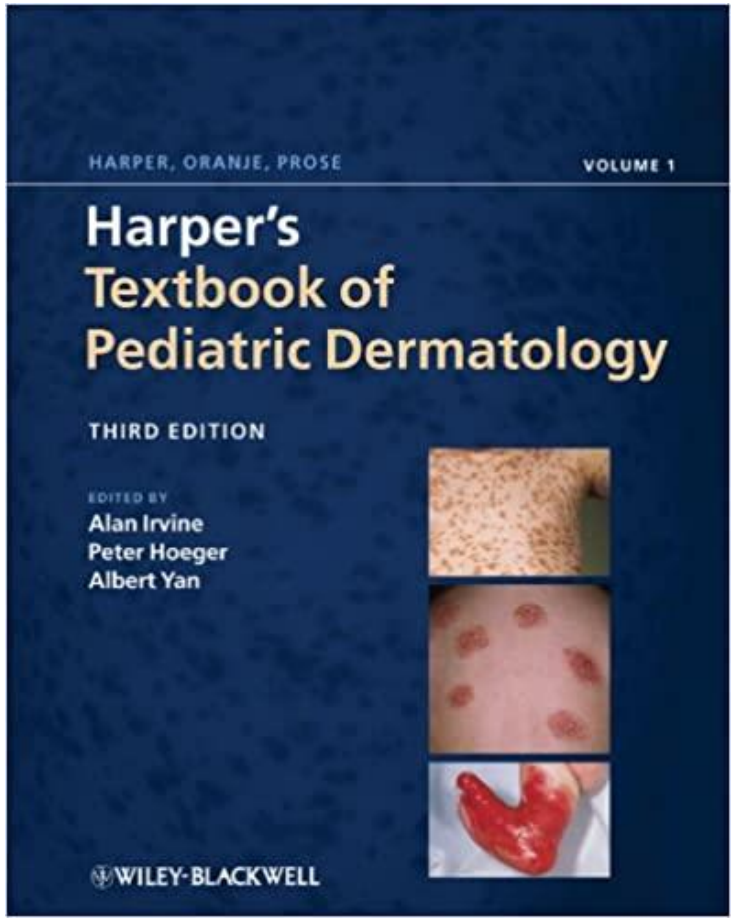
- **Second-line treatment**
- It should **only** be used for patients who cannot tolerate or whose infestation has **failed to respond to first-line treatment**.

Contraindicated for use in **neonates**

Extreme caution

Children -weigh less than 50 kg - HIV infection - certain medications that can lower the seizure threshold.

Lindane 1 %



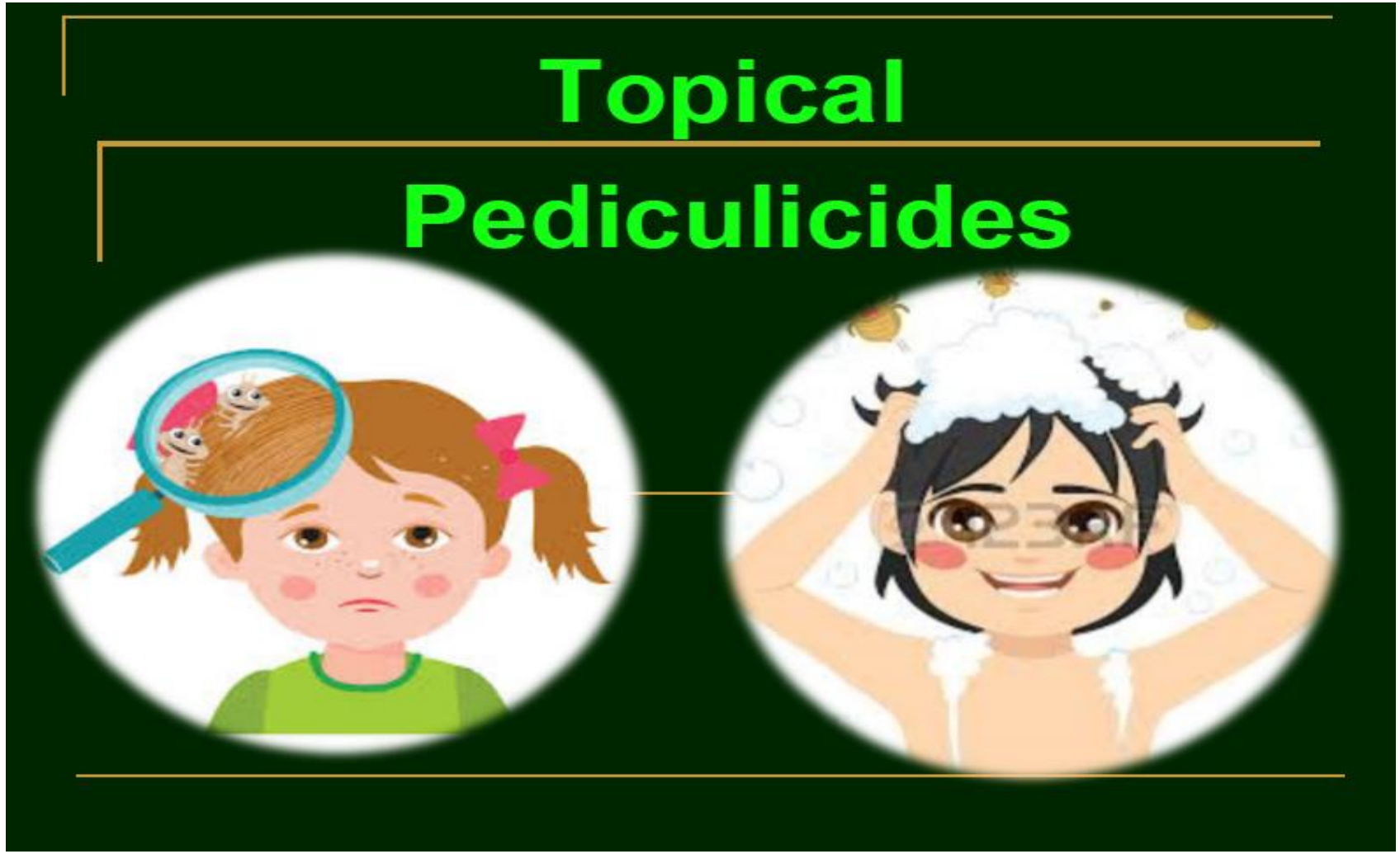
Lindane is **contraindicated** in **neonates** and children **less than 2 years** of age due to its central nervous system toxicity.

SAFETY : Lindane 1%

- FDA pregnancy category : **C**
- NOT recommended breastfeeding mothers

- Side effect : It is **absorbed into the blood** and slowly metabolized and should not repeatedly be used.
- This agent has a potential for **neurotoxicity** .Several cases of severe **seizures in children .**

Malation 0.5 %



Malathion 0.5% (Ovide)

Contain 78% isopropyl alcohol

- Organophosphate cholinesterase inhibitor (Respiratory paralysis in arthropods)
- High ovicidal activity, a **single application** is adequate for most patients.
- **Prolonged** application **time** applied to dry hair , left to air dry, then washed off after **8-12 h**
- Gel form : effective with short contact duration of 20 min.

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Malathion 0.5%

- **Not** to use a **hair dryer**, **curling iron**, or **flat iron** while the hair is wet
- **Not** to **smoke** near a child receiving treatment, for its flammability.

SAFETY : Malathion 0.5%

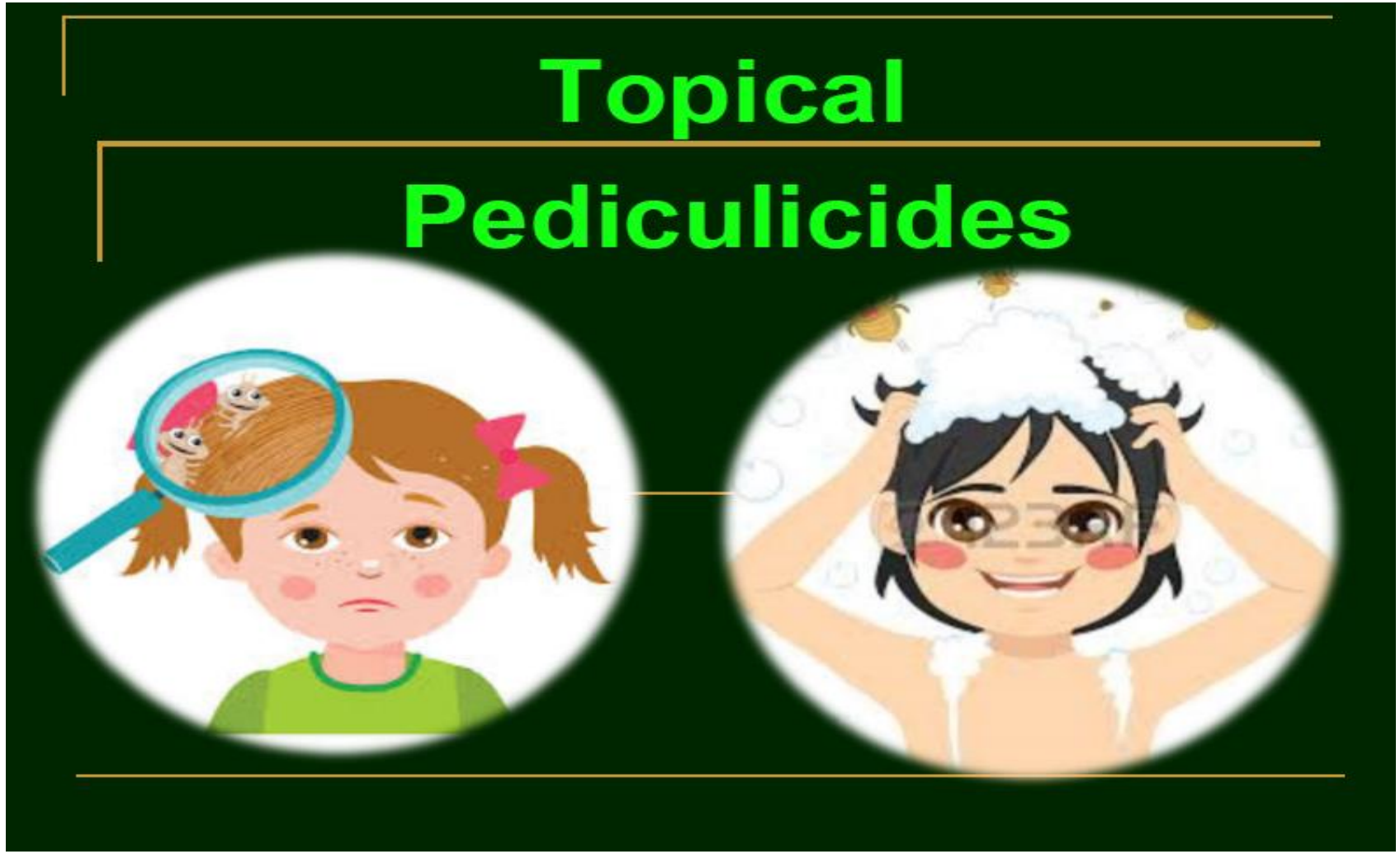
- Safety and effectiveness of malathion lotion have **not** been established in **children younger than 6** years.

- **Contraindicated** in children **younger than 2 years**. (It has a theoretic risk of respiratory depression if accidentally ingested, for its cholinesterase inhibitory property)

- Side effect : Flammable (isopropyl alcohol Base), burning or stinging at sites of eroded skin malodor.

Malation 0.5 %

Benzyl alcohol 5%



Benzyl alcohol 5% Lotion

- First non-neurotoxic pediculicide
- **Topical suffocation** treatment (Asphyxiation by preventing lice from closing their respiratory spiracles)
- **Not ovicidal**

- saturate the hair and should be left for **10 min** and **repeated** in **7 days**, consideration should be given to retreating in 9 days .
- 3 treatment cycles (days 0, 7, and 13-15)

SAFETY: Benzyl alcohol 5%

- FDA pregnancy category : **B**
- **2009, FDA approved** head lice in **children more than 6 months of age.**

- It appears to have an efficacy comparable to pyrethrins.
- Side effects : Pruritus, erythema, pyoderma, and ocular irritation are its usual.

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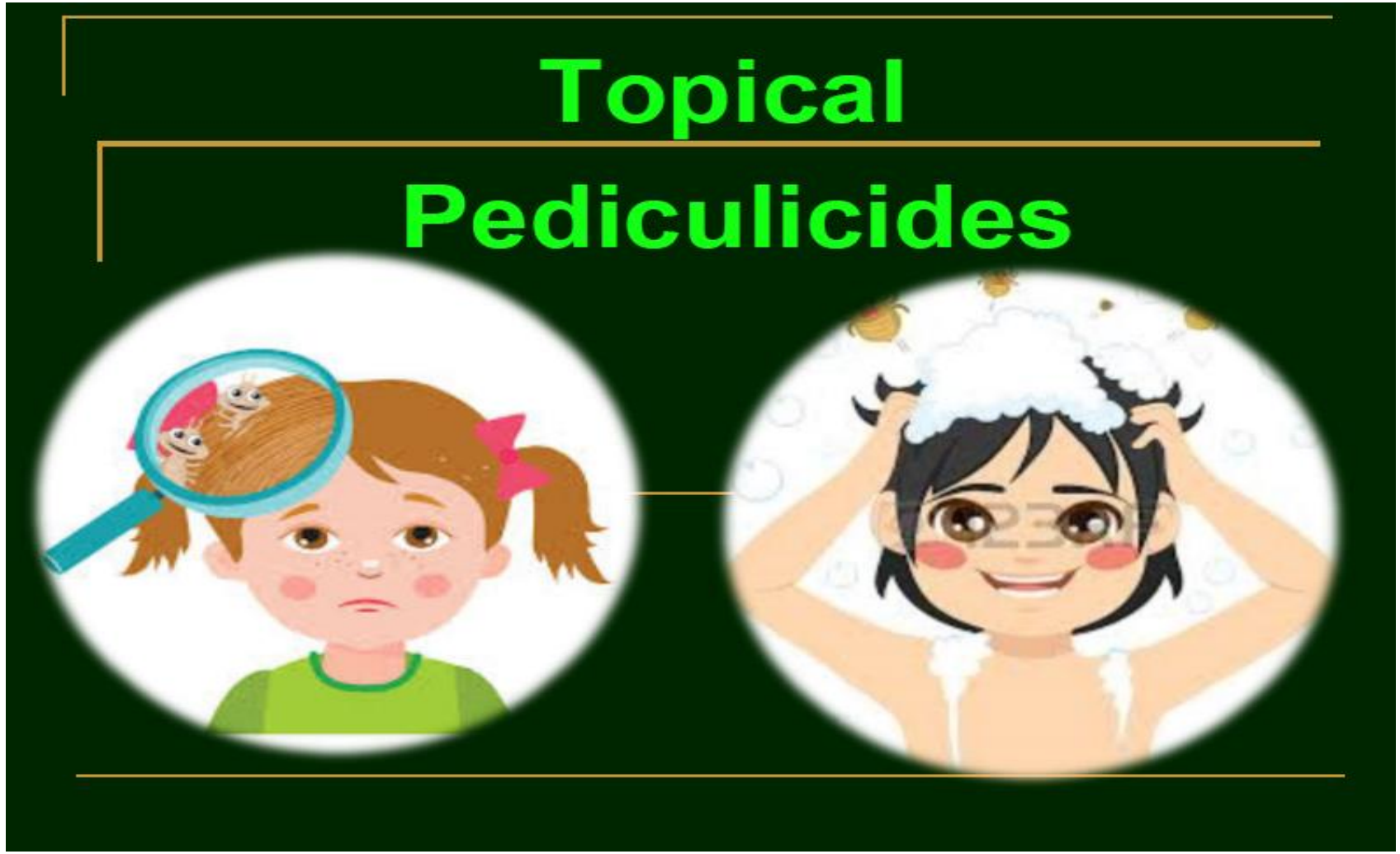
Spinosad 0.9% cream



Spinosad 0.9% (Natroba)

- Topical pediculicidal (hyperexcitation,death by paralysis)
- **Fermentation** of a naturally occurring organism
- **Ovicidal**
- Single topical application

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Spinosad 0.9%

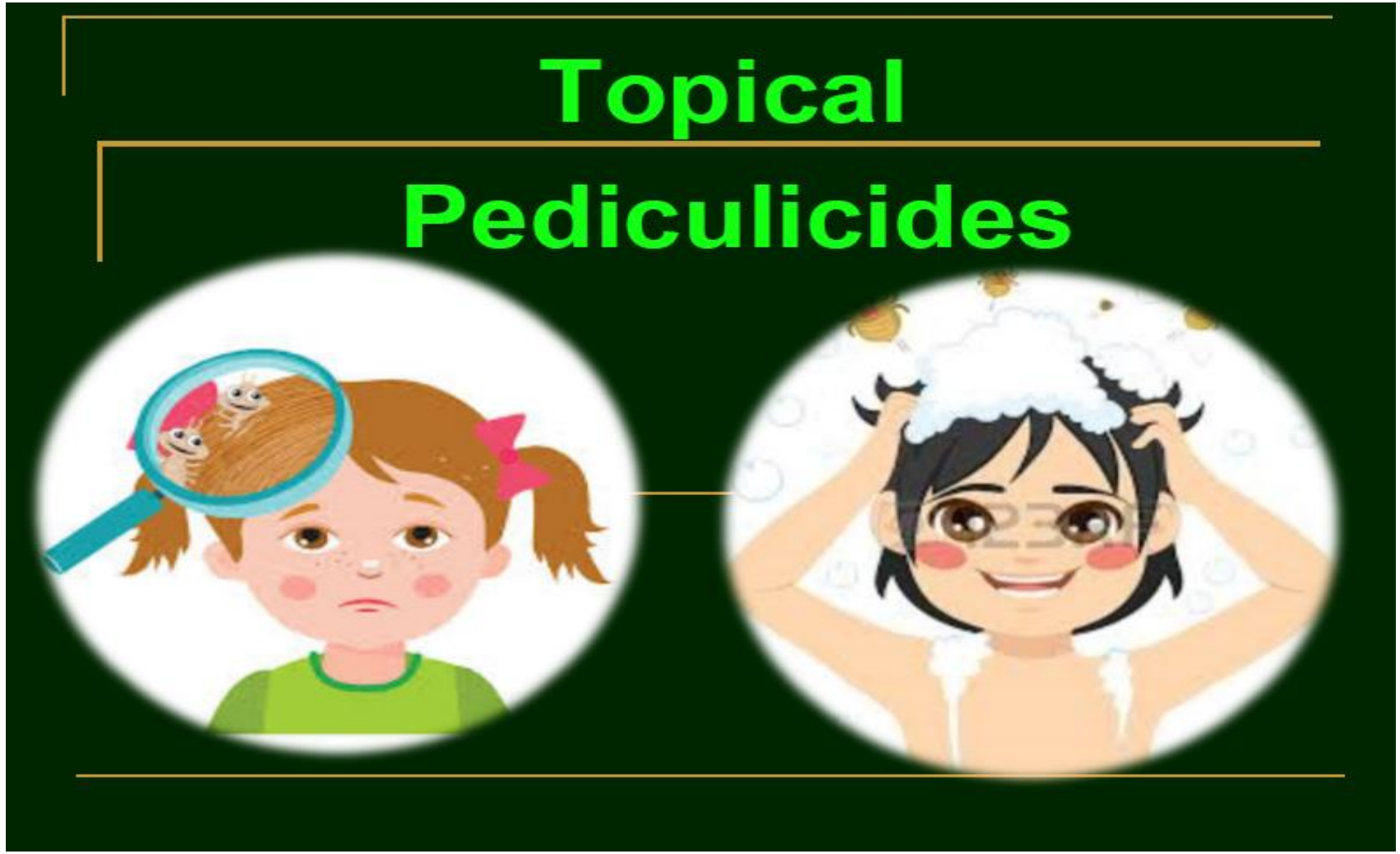
- It may be beneficial for patients **not adherent to other therapies.**
- Spinosad kills **both permethrin-susceptible and permethrin-resistant** populations of lice.
- It was found to have **twice** the eradication rate of permethrin at 14 days and is effective after a single dose.
- The majority of subjects treated with spinosad 0.9% without nit combing required only a **single treatment to eradicate** head lice, whereas the majority of those treated with **permethrin 1%** with **nit combing required 2 treatments**.

SAFETY: Spinosad 0.9%

- FDA pregnancy category : **B**
- **2011, FDA approved** head lice in **children more than 4 years of age**.

- Side effect : **Cutaneous and ocular irritation** are the common adverse events.

Ivermectin 0.5-1%



Topical ivermectin 0.5% -1 lotion

- It is **approved** for use in **children older than 6 months**
- applied for **10 min**
- Side effect : **EYE – SKIN**
- Conjunctivitis, ocular hyperemia, eye irritation, dandruff, dry skin, and skin-burning sensation

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Ivermectin topical

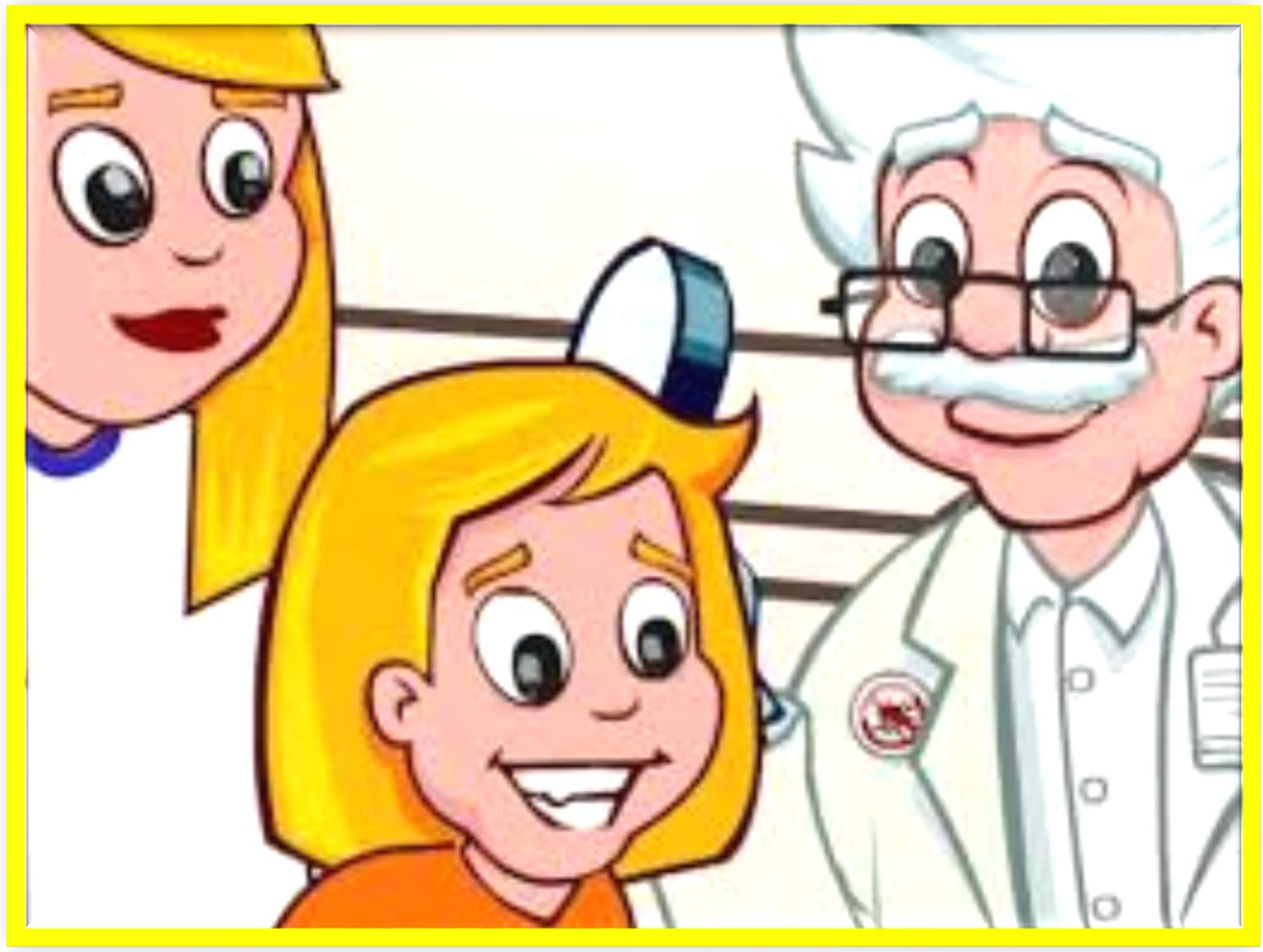
Safety : Ivermectin 0.5 -1 %

- FDA pregnancy category : **C**
- FDA : **Single use**

Clinical point

❑ Potent ovocial activity

- ➢ **Malation (B)**
- ➢ **Spinosad (B)**
- ➢ **Ivermectin (C)**

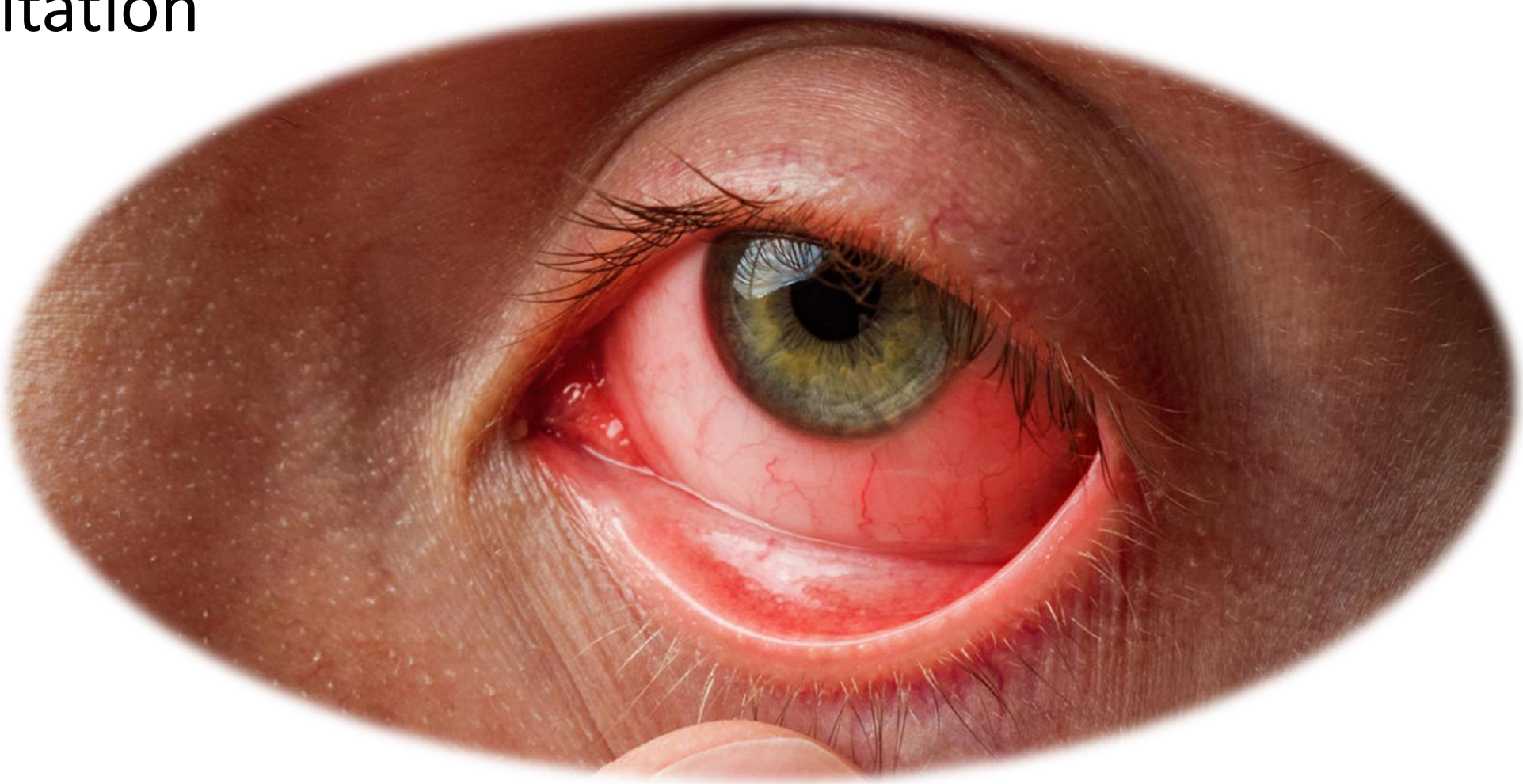


Caution

- All topical pediculicides should be rinsed from the hair over a sink rather than in the shower or bath to limit skin exposure and with warm rather than hot water to minimize absorption attributable to vasodilation.

Corneal Damage

Ocular irritation



Hair over a **sink**

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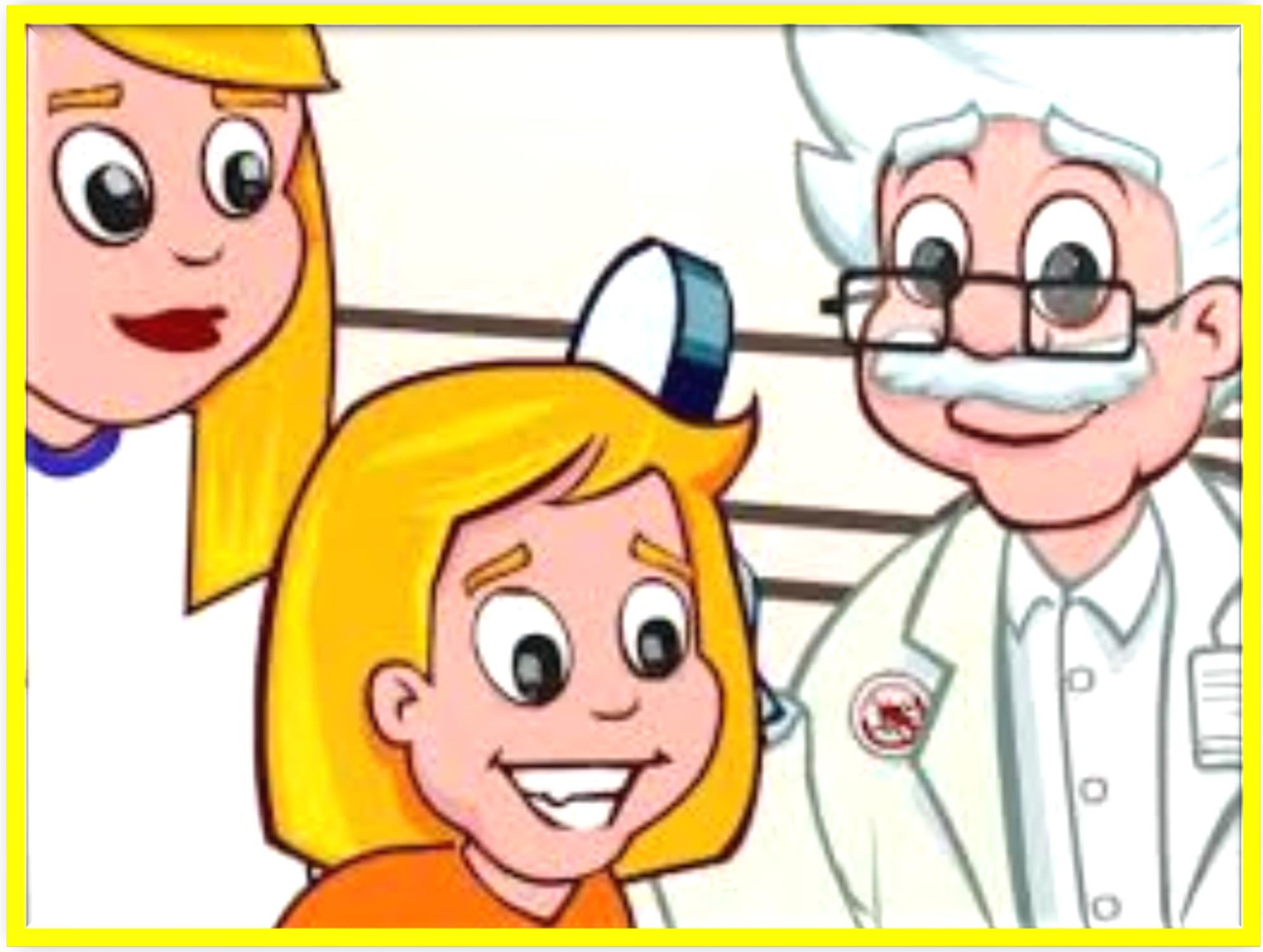
Non-conditioner Shampooing

NO Hairdryer Hair drying



Systemic therapy

1. Ivermectin
2. Albendazole
3. Levamisole
4. Co-trimoxazole (conflicting data exist regarding its efficacy)
5. Oral antibiotics for secondary infection
6. Oral antihistamines

Systemic therapy

ORAL IVERMECTIN

Oral ivermectin

- An anthelmintic agent

- Oral dose of **200-400 mcg/kg**

A **single oral dose of 200 µg/kg, repeated in 10 days.**
A single oral dose of 400 µg/kg repeated in 7 days .

- The **only currently-used oral treatment**

- Excellent; **second-line** therapy **when the lice are resistant** to topical treatments.

RULE OF 15 :
Do not use under 15 kg
Each 15 kg : 1 Tablet (Max : 4)

SAFETY :Oral ivermec

- FDA pregnancy category : **C**
- **Not FDA-approved** for pediculosis
- Side effect **Potential CNS toxicity** (cross the BBB - block essential neural transmission
- **Not recommended** for
- Neonate and infant
- Children weighing 15 kg
- Breastfeeding mothers
- Pregnancy

CHILD COTRIMOXAZOLE

Sulfamethoxazole-trimethoprim

- Antibiotic agent
- kills the symbiotic bacteria in the gut of the louse or perhaps has a direct toxic effect on the louse.
- Adult and nymphal stages but not the eggs
- Minimal effective dose : **1 tablet twice daily for 3 days** (160 mg trimethoprim/800 mgsulfamethoxazole)
- increased effectiveness when combination with permethrin 1%

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Tablet CHILD (Sulphamethoxazole/ Trimethoprim) 100/20 mg
Syrup CHILD(Sulphamethoxazole/ Trimethoprim) 200/40 mg

8-10 mg/kg/day divided BD for 10 day
Tablet CHILD 100/20 : 10 kg : 1 tablet
Syrup 200/40100 mg : 0.25 cc/Kg/day

ALBENDAZOLE

ORAL ALBENDAZOLE

Mitochondrial dysfunction in the parasite

ATP depletion and cell death.

400 mg as a single oral dose, repeated after 7–10 days

LEVAMISOLE

ORAL ALBENDAZOLE

Acetylcholine receptor agonist

Acts by causing tonic paralysis of the Ectoparasites.

50 mg for children with a weight of **10–19 kg**

100 mg for children **20–39 kg**

General therapy

1. Mechanical removal of nits
2. Wet combing
3. Hot hair treatment (LouseBuster™)
4. Disinfection of surrounding household environment
5. Treatment of household contacts

General therapy

Removal of the lice by hand (nit - picking)

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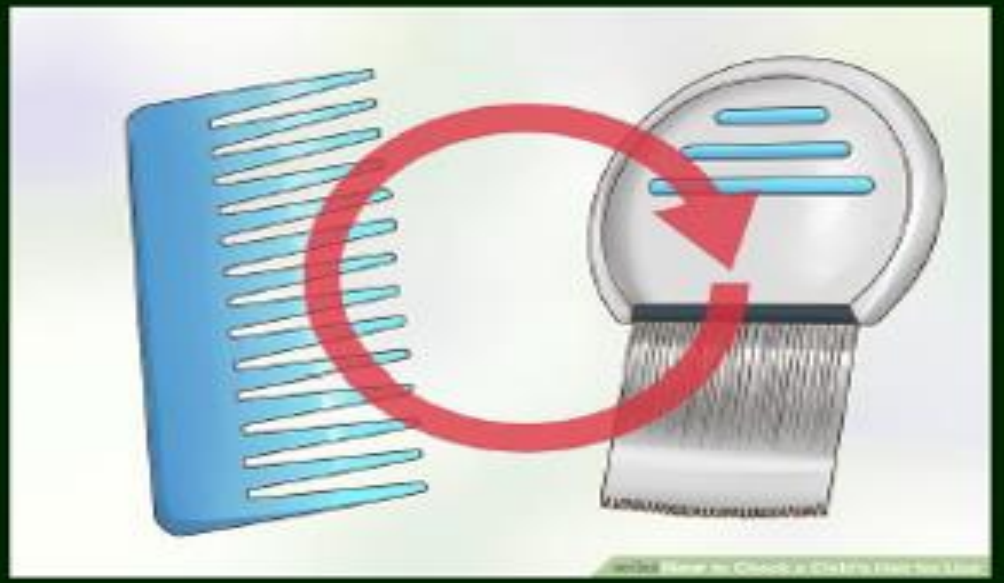
Wet combing



- In conjunction with other treatments.
-
- The recommended procedure is hair conditioner to wet hair followed by combing with a **fine - toothed nit comb** until all **live lice** are removed .

- This is repeated **every 3 – 4 days**

At least **2 weeks after the last louse is detected.**

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Louse Buster™

Hot air delivery system

puffs of hot air to the base of hair shaft.

Temperatures of **58–60 °C**

(damage to nits, nymphs and live lice through desiccation)

The time required : about **30 minutes**

Louse Buster™

The kill rate : 80% for lice and 98% for eggs

The disadvantages :

- ❑considerable discomfort
- ❑ cost
- ❑ potential of sending lice airborne

Household environment management

Disinfection of the surrounding household environment

(prevent relapse)

All household objects, clothes, towels, bed linens and toys

had contact with 2 days before the diagnosis

washed in hot water (50 °C)

dry cleaned or ironed

Dermin Insect Repellent Spray Liquid

Permethrin

Residual effect

6 WEEK

Nella spray

Herbal product

Alternative therapy

1. Hexane flower bud extract (*Syzygium aromaticum*)
2. Silicone–oil complex as asphyxiants
3. Galenic metaemulsion
4. Dimeticone 4% lotion
5. Essential oils
6. Occlusive agents (petroleum jelly)

Alternative therapy

Shaving the child ’ s hair

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Asphyxiation techniques

- Asphyxiation techniques : kill lice by obstructing lic breathing
- Dimeticone
- Isopropyl myristate
- Petrolatum (12 h - although daily hair washing for 7 – 10 days may be required to remove the residue.
- Similar home remedies (olive oil, herbal oils PLUS CAP) : not be used in younger children because of safety concerns.

Dimeticone 4%

- Two applications **7 days apart** of **dimeticone 4% lotion**
- Applied for **8 hours or overnight**

Isopropyl myristate (49.5%)

Nylice •

- Head Lice and Nits Elimination Solution
- (Isopropyl Myristate 49.5%)
- **Remove the cuticle of parasite**
- 10 MIN
- Repeat 7 days later

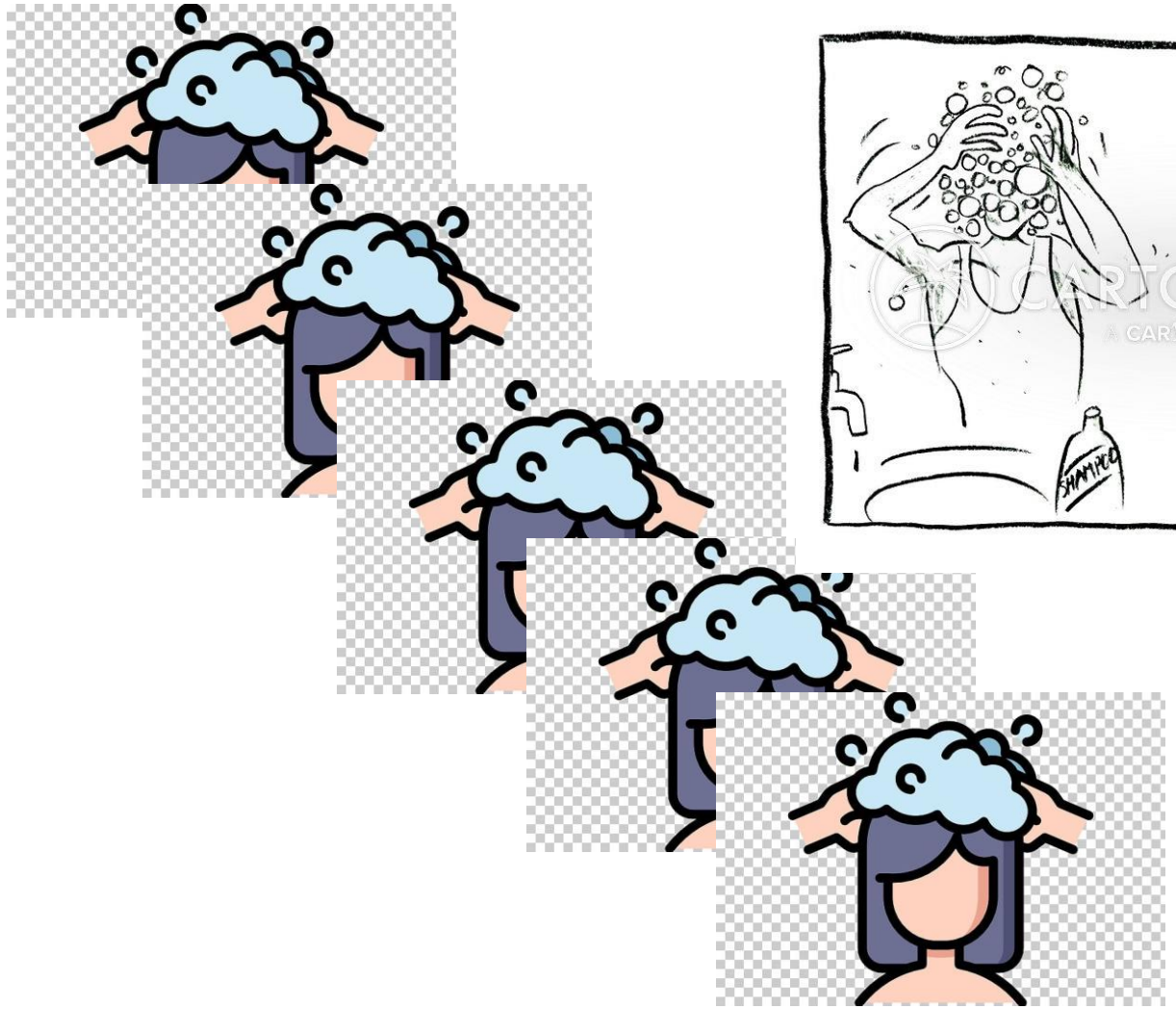
Benzyl alcohol 5%

Admixed with mineral oil

- A **non – neurotoxic formulation**
- two applications 7 – 10 days apart.
- Benzyl alcohol stun the spiracles causing them to stay open and allowing the mineral oil to penetrate the respiratory apparatus to suffocate the louse

SIDE EFFECT : Potential skin irritation

Difficulty for remove the residue



Head Lice AND Mayonnaise Treatment

Head Lice AND Mayonnaise Treatment

Miscellaneous formula


شامپو +
روغن ضد شپش نلا
گیاهی
NELA
لابراتوار نلا
از بین برنده شپش در ۱۰ دقیقه
همراه با شانه و کلاه
ضد التهاب ، نرم کننده
ضد خارش ، بدون بو
غیر سمی
قابل استفاده برای کودکان و
خانم های باردار و شیرده
۱۲۰±۲% میلی لیتر روغن
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NELA
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Natural
نرم کننده
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لابراتوار نلا
برای انواع مو
۱۲۰±۲ میلی لیتر
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No lice Shampoo

hydro alcoholic extract of **eucalyptus monoterpenoids and tetralin** derivate do have **neurotoxic effects**

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Moov Shampoo

Present By: Dr. Bahareh Abtahi-Naeini

Parasidose Shampoo

Present By: Dr. Bahareh Abtahi-Naeini

Treatment failure in head lice

Treatment failure

- Treatment failure in head lice may be due to
- **Inadequate treatment** (A combination of insecticide use and regular wet combing has been suggested to optimize therapy)
- **Pediculocide resistance**
- **Reinfestation**

Prophylactic treatment may be considered for persons who share the same bed with actively infested individuals.

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Re- infestation

Parents of children with head lice are advised to concentrate their efforts on **regular head examinations** of the entire family

- It is important that **all family members and contacts** are examined carefully for evidence of live lice or nits

Not expend energy on **unnecessary** house cleaning or **disinfestation of inanimate objects**

Treatment of fomites

(hats, combs and so on is controversial because head - to - head contact is the primary route of infestation)

Present By: Dr. Bahareh Abtahi-Naeini

Resistance of head lice to TX

- Resistance of head lice to commercially available insecticides is now well recognized
- Resistance patterns may vary depending on **previous exposure**

- Resistance of head lice to

lindane

Permethrin (**mutations in sodium channel genes)**

Malathion

- A policy of **rotation of pediculocide** use in particular geographical

Sara : 3 Y/O – 13 kg

Dara: 10 Y/O – 30 Kg

Tara : 5 Mon – 5 kg

MOM: PREGNANT

DAD: HX Seizure

3 Times use of Permethrin :10 min

MOM : Myonez

School off :
2 weeks

Dara:
30 Kg
2 Tablet

Permethrin :resistance protocol: All

Dilice :All

Lindane : Dara

Ivermectin :Dara

WET COMBING

No nit policy

No nit policy is a public health policy implemented by some education authorities to prevent the transmission of head lice infestation .

The "no nit" policy requires the **sending home** and barring of **all children who have nit** on their hair from controlled settings such as school, summer camp or day care facilities

“No-nit” policies should be discontinued

CDC :

Children can return to class after appropriate **treatment has begun**


Thank
you!