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COLOR ATLAS & SYNOPSIS OF PEDIATRIC DERMATOLOGY

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5th Edition

JAYPEE

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CHAPTER

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Infections and Infestations

SCABIES (FIGS. 1 TO 3F)

Scabies is a common, itchy condition caused by the mite *Sarcoptes scabiei* var. *hominis*. The itching is worst at night when the patient is warm. The onset occurs 3–4 weeks after the infection is acquired and it coincides with a widespread eruption of inflammatory papules. The pathognomonic lesions of scabies are burrows which appear as slightly raised, brownish tortuous lesions. They occur commonly on the wrists, borders of the hands, the sides of the fingers and the finger web spaces, the feet particularly the instep and, the genitalia. In infants the head and neck may be involved. With the development of hypersensitivity, pruritic papules develop. Secondary changes may frequently confuse the clinical picture. Eczematous changes are common and may be widespread and severe. Secondary infection, manifests as folliculitis or impetigo, may also be severe and extensive.

In infants in addition to the more extensive burrows seen in older children and adults, vesicular and vesiculopustular lesions on the hands and feet are frequent. Extensive eczematization is often present and there may be multiple crusted nodules on the trunk and limbs. Many children with scabies develop persistent skin colored to reddish nodules over axillae, shoulders, groin, buttocks, and scrotum. These lesions result from the hypersensitivity reaction to scabies mite and tend to persist for months together even after treatment of scabies. Crusted scabies also called as Norwegian scabies though uncommon in children is extremely contagious, can be seen in immunocompromised, human immunodeficiency virus (HIV) infection and neurological manifestations such as mental retardation. Along with eczematous lesions, there is diffuse crusting and hyperkeratosis.

Fig. 1: Inflammatory papules and burrows over finger web spaces in scabies.

Complications

Secondary infections of scabies lead to pustule formation and impetiginization. Nephritogenic strain of *Streptococcus* may rarely cause glomerulonephritis.

Treatment

Permethrin (5%) cream is the treatment of choice in infants and children. It can be used safely in infants as young as 2 months of age. It is to be applied in adults and young children from neck to toes and in infants from head to toes including palms and soles. It is to be left on for 8–14 hours. If necessary, it may be repeated after 1 week. Treatment of close contacts and all family members is necessary.

Gamma-benzene hexachloride (1%) is the most widely used antiscabietic because of its efficacy and cheaper cost than permethrin. There are occasional reports of neurotoxicities which are almost exclusively due to its inappropriate, prolonged or repetitive use or accidental ingestion by infants/young children. It is not recommended in infants and small children and cannot be applied over head and face. Systemic treatment includes oral ivermectin. It is considered to be safe in children above 2 years of age. Two doses of 200 µg/kg of body weight at 1-week interval have been recommended.

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Figs. 2A to C: (A and B) Scabetic burrows in the web space and soles; (C) Scabies with vesiculation.

Decontamination of the environment and systemic antibiotics for secondary infection are necessary.

NORWEGIAN SCABIES (FIGS. 3G TO K)

It is also known as crusted scabies. It occurs usually in immunocompromised individuals, but may occur rarely in immunocompetent persons and in Down's syndrome. It presents with crusting, scaling and psoriasiform changes. It may be localized to scalp, face, fingers including nails, toenails, palms, and soles. As compared to 10–12 mites in classical scabies in Norwegian scabies, there may be millions of mites. Hence, it is extremely contagious and often results in outbreak of scabies in families, crèches, schools, swimming pools, and hospitals. Treatment failure is common. Concomitant oral and topical treatment is useful in patients with crusted scabies. This avoids repeated dosing and ensures early cure. Combination treatment regimens used include use of topical agents such as permethrin 5% cream with oral ivermectin. It was found that topical benzyl benzoate emulsion with oral ivermectin was successful in severe crusted scabies. These applications are repeated till the mites are eradicated. Correct application must be achieved, including the subungual areas and up to edges of lower body orifices. Additionally, the hyperkeratotic crusts should be scrubbed with topical scabicidals with nail trimming. Nail taping with 40% urea has also been tried.

PEDICULOSIS

Pediculosis or louse infestation is a worldwide problem but poor living conditions with resultant poor personal hygiene contribute to epidemic proportions of the infestation in developing countries. The three types of lice that infest human beings are: (1) *Pediculus humanus capitis* (head louse), (2) *Pediculus humanus corporis* (body louse), and (3) *Pthirus pubis* (crab louse).

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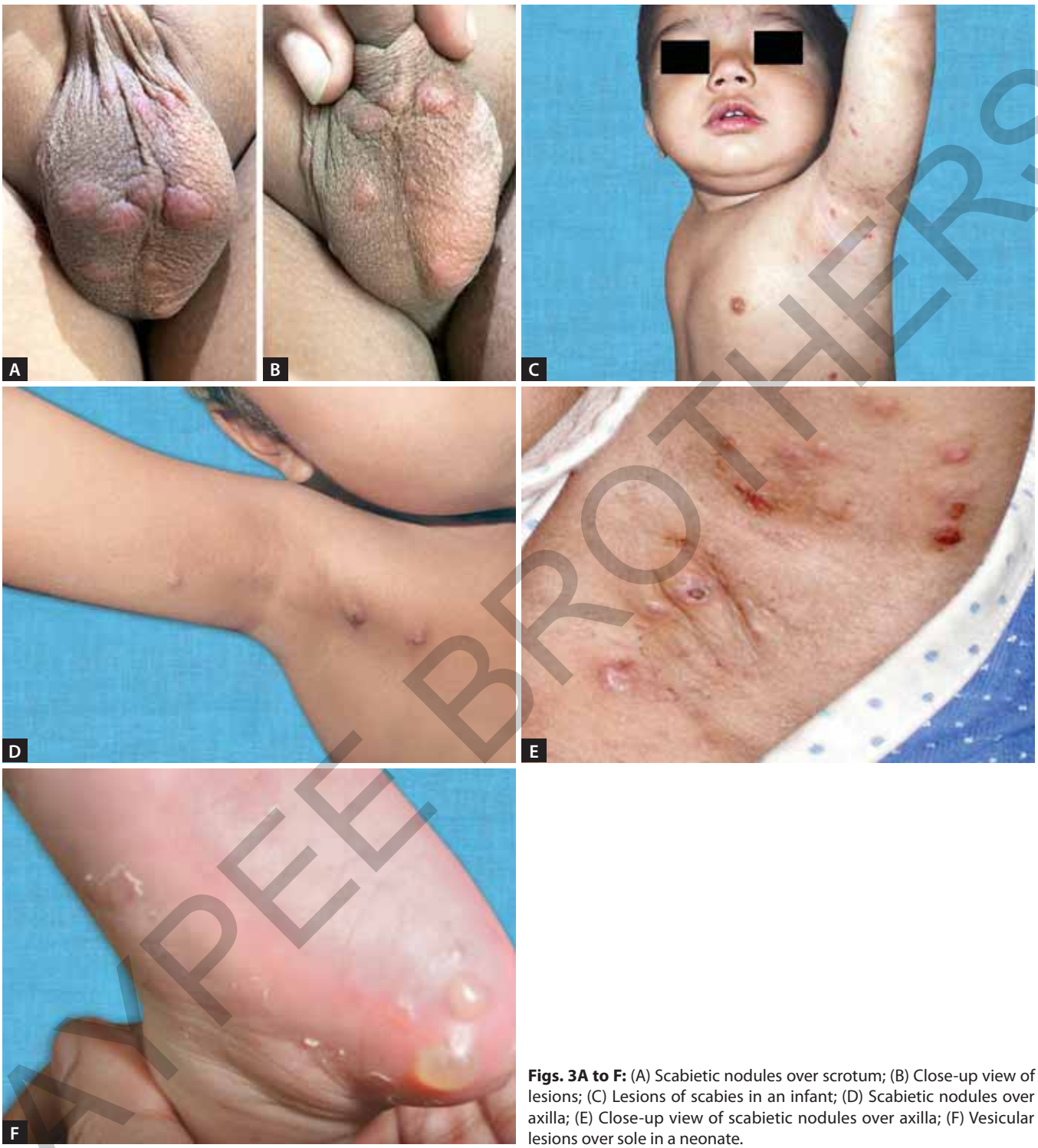

Figs. 3A to F: (A) Scabietic nodules over scrotum; (B) Close-up view of lesions; (C) Lesions of scabies in an infant; (D) Scabietic nodules over axilla; (E) Close-up view of scabietic nodules over axilla; (F) Vesicular lesions over sole in a neonate.

Pediculosis Capitis (Head Louse Infestation) (Figs. 3L to N)

It is caused by infestation of the scalp with *Pediculus humanus capitis*. Head louse is brown in color and lays about 50–150 ova (nits) during an average adult life of approximately 16 days and it measures 1–2 mm in length. They molt three times to develop into an adult over a period of almost 2 weeks. Head louse infestation

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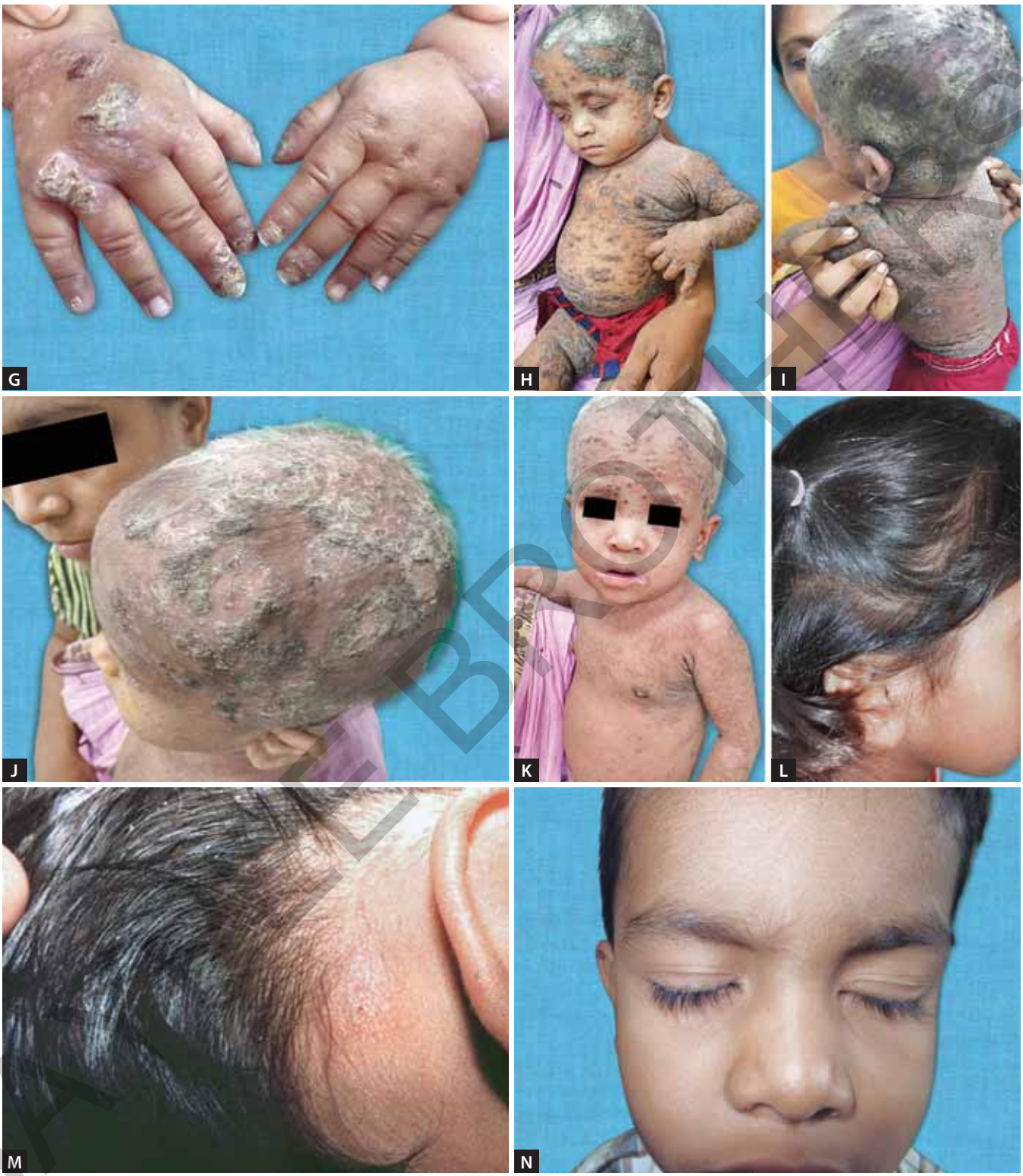

Figs. 3G to N: (G) Hyperkeratotic lesions over hands in Norwegian scabies; (H) Norwegian scabies, note extensive crusted lesions and scabietic papules in finger web spaces of accompanying lady; (I) Same child, close-up view of back lesions; (J) Close-up view of scalp lesions, showing extensive crusted plaques; (K) After 3 weeks' treatment; (L) Pediculosis capitis; (M) Pediculosis capitis, note nits attached to scalp hairs; (N) Pediculosis of eyelids.

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"You have to take risks. We will only understand the miracle of life fully when we allow the unexpected to happen." **—Paulo Coelho**

Figs. 3O to Q: (O) Pediculosis corporis; (P) Pediculosis corporis, close-up view; (Q) Pediculosis pubis.

commonly affects females with long hair. The nits are firmly attached to the hair and can slide along the hair but cannot be shed off like scales and the nits are grayish white, oval in shape and about 0.5 mm in length. The transmission is through close contact, sharing of headgear, combs and hairbrushes. In head louse, itching is the predominant symptom and secondary infection with enlargement of occipital lymph glands is the common presentation. Diagnosis is definitive when crawling lice can be seen on a naked eye but microscopic identification of the louse or the stuck on nits on the hair shafts is confirmatory. Exudation, crusting, excoriations and erythematous papules on the neck in females should arouse suspicion of pediculosis capitis.

Manual removal of nits and lice has been practiced from ages but it is a tedious job. Treatment of choice for pediculosis capitis is 1% permethrin. It is applied on slightly damp hair for 5–10 minutes and rinsed off. Second application is necessary after 1 week. Other modalities of treatment that have been used include gamma benzene hexachloride 1%, malathion 0.5%, and spinosad 0.9%. For severe cases, off-labelly oral ivermectin and trimethoprim-sulfamethoxazole have been used. Careful examination of all family members and close contacts is necessary and those with evidence of lice should be treated.

Pediculosis Corporis (Figs. 3O and P) (Body Louse Infestation)

It is generally seen among the poor, homeless or mentally retarded subjects. Body lice generally thrive in conditions of poverty, war, and natural disaster. It is rarely seen in children.

The body louse is about 4 mm in length and lives in the seams of clothes and lays about 270–300 ova during an average 18 days of adult life. Nits incubate for 8–10 days and nymphs mature into adults over about 2 weeks.

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Severe itching, excoriations, hemorrhagic crusts and blood-stained clothes are the presentation of body louse infestation. In chronic cases, hyperpigmentation and lichenification can also be seen. The diagnosis can be made by high degree of suspicion and demonstration of lice or nits from the seams of clothing. Treatment consists of proper hygiene, laundering and ironing of clothes and application of insecticides to clothing. Application of permethrin or gamma benzene hexachloride to body hair may be helpful.

Pediculosis Pubis (Fig. 3Q)

Pediculosis pubis is caused by crab louse. It is commonly spread by sexual contact but can be transmitted by clothing or towels. An adult female can lay about 25 eggs during its life span. It mainly attaches to the pubic hair but can be spread occasionally to axillary hair, eyebrows, and eyelashes. The patient complains of itching and on examination bluish gray macules (maculae ceruleae) can be seen on the lower abdomen and thighs. The lice look-like brownish spots attached to the hair.

Therapy consists of single application of pediculicides that is gamma benzene hexachloride 1% or permethrin 1%. In case of eyelash involvement, petrolatum can be applied three to four times a day for 7 days. Manual removal, shaving of hair and even oral ivermectin can be employed as measures for eradication. Sexual partners should also be treated.

BURROWING BUG PIGMENTATION (FIGS. 3R TO U)

Burrowing bugs, also called as *Cydnidae* bugs, are arthropods of the order *Hemiptera* causing exogenous pigmentation of the skin due to release of an odorous substance from special glands that serve as self-defense rather than a bite. It forms pigmented macules when it comes in contact with the human skin. This pigmentation is seen in children especially in rainy season during outdoor activities. Clinically presents as sudden onset of pin-point to few millimeters size, discrete to grouped asymptomatic pigmented (brownish-orange hue) macules distributed mainly on palms, soles and rarely chest and neck. These pigmented macules are bizarre, streaky in shape with tapering edges. The pigmentation could be rubbed off by acetone. Differential diagnoses include acral melanocytic nevi, lentiginous nevi, petechiae, dengue-induced purpura, dermatitis neglecta, postinflammatory pigmentation, postviral exanthem, and pigmentation due to contact with chemicals. Dermoscopy helps in ruling out other differential diagnosis. Dermoscopy of burrowing bug pigmentation shows cluster of oval to bizarre-shaped brown and shiny globules and clods with a superficial "stuck on" appearance. Lesions resolve spontaneously in few days without any residual changes.

LARVA MIGRANS (FIG. 3V TO X)

Cutaneous larva migrans or creeping eruption is a serpiginous cutaneous eruption resulting from penetration of human skin by various animal worms.Common worms are *Ancylostoma braziliense* (cat hookworm) and *Ancylostoma caninum* (dog hookworm). Humans acquire it from an environment contaminated with animal feces containing eggs of worms. There may be two modes of spread: (1) Cutaneous (cutaneous larva migrans); and (2) Oral (visceral larva migrans). Clinically, lesions of cutaneous larva migrans present as itchy serpiginous lesions, sometimes erythematous most commonly over hands, wrist, feet, ankle or lower legs. The diameter of the thread-like line is usually 3 mm. The larvae usually migrate at the rate of few millimeters daily, rarely few centimeters per day, when the line spreads quite rapidly. If cutaneous larva migrans remains unrecognized, it usually dies in 2–8 weeks' time. The condition is treated with a single dose of ivermectin 200 mg/kg of body weight. Other option is albendazole 400 mg/day for 3–7 days. The lesion stops progression after 5–7 days' treatment and itching also subsides completely.

FURUNCULOSIS (FIG. 4)

This is an acute, painful and deep necrotic infection of a hair follicle with *Staphylococcus aureus.* A furuncle presents initially as a small, follicular, inflammatory nodule, soon becoming pustular and then necrotic and healing after discharge of a necrotic core to leave a violaceous macule and ultimately a permanent scar. Tenderness is a constant feature. Lesions may be single or multiple and tend to appear in crops. The sites involved are the face and neck, the arms, wrists and fingers, the buttocks and the anogenital region. In some individuals, crops continue to develop for many months or even years. Associated features include fever and lymphadenopathy. Recurrent furunculosis refers to three or more episodes of furuncles within a 12-month period. Colonization of *S. aureus* in anterior nares can lead to chronic or recurrent furunculosis. Other predisposing factors for recurrent furunculosis are anemia, previous antibiotic therapy,

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Figs. 3R to X: (R) Burrowing bug pigmentation, multiple discrete hyperpigmented macules on knee joint; (S) Burrowing bug pigmentation lesions over palms; (T) Same child, lesions over soles; (U) Blackish macules of burrowing bug pigmentation over sole; (V) Larva migrans; (W) Creeping eruption over buttocks; (X) Creeping eruption over trunk.

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methicillin-resistant *S. aureus* (MRSA) infection, poor personal hygiene, and underlying systemic disorders.

The mainstay of therapy is topical and systemic antibiotics along with incision and drainage. For recurrent

"Why should I be unhappy? Every parcel of my being is in full bloom." **—Rumi**

furunculosis, decolonization with topical mupirocin ointment to anterior nares, behind the ears and groin are important.

Fig. 4: Inflammatory papulopustules of furuncle over forehead.

FOLLICULITIS (FIGS. 5A TO E)

Folliculitis refers to pyoderma of the hair follicles and is classified according to the depth of involvement and microbial etiology.

Etiology

Staphylococcus aureus is the most common cause of bacterial folliculitis; however, the other causes include *Pseudomonas aeruginosa* (hot tub folliculitis), gram-negative folliculitis (in patients of acne on long-term topical and oral antibiotics), and syphilitic folliculitis.

Fungi implicated include dermatophytes, *Pityrosporum ovale*, and candidal species.

Herpes simplex virus and molluscum contagiosum virus have been implicated in the development of folliculitis.

Infestation by demodex mite may also present as folliculitis lesions predominantly on the perioral area.

Figs. 5A to E: (A) Close-up view of furuncle; (B) Folliculitis over leg; (C) Folliculitis, note erythematous papulopustular lesions; (D) Folliculitis lesions, close-up view; (E) Folliculitis over leg, very common after hair removal in young adolescent girls.

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Sandipan Dhar MBBS MD DNB FRCP(Edinburgh) is currently the Professor and Head, Department of Pediatric Dermatology, Institute of Child Health, Kolkata, West Bengal, India. He has so far published more than 290 scientific papers of which more than 150 are on "Pediatric Dermatology" and more than 70 are on "Atopic Dermatitis". He delivered more than 110 international and 320 national lectures. He authored the first book on "Pediatric Dermatology" in skin of color way back in 2003. He has authored five more books in "Dermatology" and has contributed chapters in more than 50 books, both national and international. His fields of interest are "pediatric dermatology", "atopic dermatitis", and adverse cutaneous drug reactions. He has delivered lectures in some of the most prestigious conferences in "Dermatology", namely World Congress of Dermatology (WCD) Vancouver, Canada (2015), Milan, Italy (2019), Singapore (2023), World Congress of Pediatric Dermatology (WCPD) Chicago, USA, 2017, Edinburgh (UK), 2021 (Virtual), International Summer Academy of Practical Dermatology, Munich, Germany (2013, 2015, and 2017) and many more. He has visited some of the most reputed Medical Institutes across the globe, delivering guest lecturers, viz., Birmingham Children's Hospital (UK), Ludwig Maximal University (Munich, Germany), Oxford University (UK), to name a few. He is one of the key persons in establishing the subspecialty "Pediatric Dermatology" in India and had been the President of Indian Society for Pediatric Dermatology for nearly 10 years, Editor-in-Chief, Indian Journal of Pediatric Dermatology (IJPD) for 9 years, Councilor and Member, Education Committee, International Eczema Council (IEC), SPIN scientific member, Chairman, Mentorship Committee and Member, Board of Directors, International Society of Pediatric Dermatology (ISPD). He is the recipient of Dr Surrinder Kaur Award for outstanding contribution to Pediatric Dermatology in India and Southeast Asia by International Society of Pediatric Dermatology. He is also the recipient of Prestigious Professor Ratan Singh Award 2023 awarded by Indian Association of Dermatologists, Venereologists, and Leprologists (IADVL) for his contribution as a teacher, researcher, and for his long-dedicated service to the association. He has been the founder President of "Society for Eczema Studies (SES)", the first of its kind in India and subcontinent, launched in March 2022.

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