<table>
<thead>
<tr>
<th>Chapters</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Body System</td>
<td>1-1 to 1-78</td>
</tr>
<tr>
<td>Section II - Musculoskeletal System</td>
<td>1-8 to 1-13</td>
</tr>
<tr>
<td>Section III - Respiratory System</td>
<td>1-14 to 1-34</td>
</tr>
<tr>
<td>Section IV - Circulatory System</td>
<td>1-35 to 1-44</td>
</tr>
<tr>
<td>Section V - Digestive System</td>
<td>1-45 to 1-56</td>
</tr>
<tr>
<td>Section VI - Genitourinary System</td>
<td>1-57 to 1-62</td>
</tr>
<tr>
<td>Section VII - Nervous System</td>
<td>1-63 to 1-70</td>
</tr>
<tr>
<td>Section VIII - Endocrine System</td>
<td>1-71 to 1-73</td>
</tr>
<tr>
<td>Section IX - Eye, Ear, Nose, and Throat</td>
<td>1-74 to 1-78</td>
</tr>
<tr>
<td>2 Communicable Diseases</td>
<td>2-1 to 2-46</td>
</tr>
<tr>
<td>Section I - Parasitic</td>
<td>2-1 to 2-11</td>
</tr>
<tr>
<td>Section II - Mycotic (Fungal)</td>
<td>2-11 to 2-15</td>
</tr>
<tr>
<td>Section III - Bacterial</td>
<td>2-15 to 2-26</td>
</tr>
<tr>
<td>Section IV - Viral</td>
<td>2-26 to 2-33</td>
</tr>
<tr>
<td>Section V - Rickettsial and Spirochetal</td>
<td>2-33 to 2-40</td>
</tr>
<tr>
<td>Section VI - Venereal</td>
<td>2-41 to 2-46</td>
</tr>
<tr>
<td>3 Clearing Airway Obstructions and CPR</td>
<td>3-1 to 3-4</td>
</tr>
<tr>
<td>4 Mental Disorders</td>
<td>4-1 to 4-9</td>
</tr>
<tr>
<td>5 Nutritional Diseases and Deficiencies</td>
<td>5-1 to 5-5</td>
</tr>
<tr>
<td>6 Pediatrics</td>
<td>6-1 to 6-9</td>
</tr>
<tr>
<td>7 Gynecology</td>
<td>7-1 to 7-15</td>
</tr>
<tr>
<td>8 Obstetrics</td>
<td>8-1 to 8-10</td>
</tr>
<tr>
<td>9 Orthopedics</td>
<td>9-1 to 9-12</td>
</tr>
<tr>
<td>10 Burns and Blast Injuries</td>
<td>10-1 to 10-11</td>
</tr>
<tr>
<td>11 Heat and Cold Injuries</td>
<td>11-1 to 11-11</td>
</tr>
<tr>
<td>12 Bites (Snake, Insect, and Animal)</td>
<td>12-1 to 12-7</td>
</tr>
<tr>
<td>13 Overdose and Poisoning</td>
<td>13-1 to 13-16</td>
</tr>
<tr>
<td>14 Nuclear, Biological, Chemical (NBC)</td>
<td>14-1 to 14-13</td>
</tr>
<tr>
<td>15 Shock</td>
<td>15-1 to 15-3</td>
</tr>
<tr>
<td>16 Emergency War Surgery</td>
<td>16-1 to 16-10</td>
</tr>
<tr>
<td>17 Anesthesia</td>
<td>17-1 to 17-20</td>
</tr>
<tr>
<td>18 IV Therapy (Fluids and Electrolytes, Basics)</td>
<td>18-1 to 18-2</td>
</tr>
<tr>
<td>19 Dental Emergencies and Treatment</td>
<td>19-1 to 19-15</td>
</tr>
<tr>
<td>20 Preventive Medicine (PM)</td>
<td>20-1 to 20-23</td>
</tr>
<tr>
<td>21 Veterinary Medicine</td>
<td>21-1 to 21-12</td>
</tr>
<tr>
<td>22 Primitive Medicine</td>
<td>22-1 to 22-4</td>
</tr>
<tr>
<td>Appendixes</td>
<td></td>
</tr>
<tr>
<td>A Anatomical Plates</td>
<td>A-1 to A-18</td>
</tr>
<tr>
<td>B Bacteriological and Parasitic Plates</td>
<td>B-1 to B-23</td>
</tr>
<tr>
<td>C Laboratory Procedures</td>
<td>C-1 to C-5</td>
</tr>
<tr>
<td>D Cellular Components of Blood, Normal Values, and Significance of Blood Test</td>
<td>D-1 to D-4</td>
</tr>
<tr>
<td>E History and Physical Examination Guide</td>
<td>E-1 to E-2</td>
</tr>
<tr>
<td>F Field Sterilization Techniques</td>
<td>F-1 to F-6</td>
</tr>
<tr>
<td>G Drug of Choice Chart</td>
<td>G-1 to G-5</td>
</tr>
</tbody>
</table>
PREFACE

This book is designed to serve as a ready reference and review for Special Forces (SF) medics. It covers diseases and medical problems that SF medics may encounter in various areas of the world. It does not, however, take the place or eliminate the need for a comprehensive medical area study.

Many treatments given in this handbook would best be given in a hospital where a laboratory and special equipment are available, and personnel with serious injuries or illnesses should be evacuated to such a hospital if at all possible. Know your limitations and do not exceed them. Remember the maxim "First thou shall do no harm" and seek the assistance of more competent medical authority whenever possible.

Since we want to use as few pages as possible in presenting this information, we use common medical abbreviations throughout. For example,

A. - analysis

ABE - acute bacterial endocarditis

ad - up to

A.M. - ante meridiem

BBT - basal body temperature

b.i.d. - twice a day

B.P. - blood pressure

BUN - blood urea nitrogen

BW - biological warfare

C. - Celsius, centigrade

CBC - complete blood count

cc. - cubic centimeter

CHF - congestive heart failure

cm. - centimeter

C.N.S. - central nervous system

COPD - chronic obstructive pulmonary disease

CPR - cardiopulmonary resuscitation

CT - clotting time

C.V.A. - costovertebral angle; cerebrovascular accident

d. - day; daily

c.d. - dilatation and curretage

DTR - deep tendon reflex

Dx - diagnosis

E. coli - Escherichia coli

e.g. - for example

F. - Fahrenheit

G.I. - gastrointestinal

gm. - gram

gr. - grain

gtt. - drops

GU - genitourinary

h. - hour

HB - hemoglobin

HCl - hydrochloride

HCT - hematocrit

HEENT - head, eye, ear, nose & throat

Hg - mercury

h.s. - at bedtime

Hx - history

ID - intradermal

I&D - incise & drain

i.e. - that is

IM - intramuscular

IV - intravenous

IU - international unit

kg. - kilogram

L. - liter

lab - laboratory

lb - pound(s)

LLQ - left lower quadrant

MCL - mid clavicular line

med - medication; medical; medicine

mEq. - milliequivalent

mg. - milligram

Mg - magnesium

MI - myocardial infarction

MIF - merthiolate/iodine/formaline solution

min - minute

ml. - milliliter

mm. - millimeter

M.U. - million units
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>Na</td>
<td>- sodium (natrium)</td>
</tr>
<tr>
<td>NBC</td>
<td>- nuclear, biological, chemical</td>
</tr>
<tr>
<td>NG</td>
<td>- nasogastric</td>
</tr>
<tr>
<td>NPN</td>
<td>- nonprotein nitrogen</td>
</tr>
<tr>
<td>N.P.O.</td>
<td>- nothing by mouth</td>
</tr>
<tr>
<td>N&amp;V</td>
<td>- nausea &amp; vomiting</td>
</tr>
<tr>
<td>O.</td>
<td>- objective findings</td>
</tr>
<tr>
<td>OD</td>
<td>- overdose</td>
</tr>
<tr>
<td>oz.</td>
<td>- ounce</td>
</tr>
<tr>
<td>P.</td>
<td>- plan of treatment</td>
</tr>
<tr>
<td>p.c.</td>
<td>- after meals</td>
</tr>
<tr>
<td>P.E.</td>
<td>- physical exam</td>
</tr>
<tr>
<td>pH</td>
<td>- hydrogen in concentration</td>
</tr>
<tr>
<td>PID</td>
<td>- pelvic inflammatory disease</td>
</tr>
<tr>
<td>PM</td>
<td>- preventive medicine</td>
</tr>
<tr>
<td>P.M.I.</td>
<td>- point of maximum impulse</td>
</tr>
<tr>
<td>P.M.N.</td>
<td>- polymorphonuclear neutrophil leukocytes</td>
</tr>
<tr>
<td>P.O.</td>
<td>- by mouth</td>
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<tr>
<td>pO2</td>
<td>- partial pressure oxygen</td>
</tr>
<tr>
<td>PP</td>
<td>- pulsus paradoxus</td>
</tr>
<tr>
<td>P.P.D.</td>
<td>- purified protein derivative</td>
</tr>
<tr>
<td>ppm</td>
<td>- parts per million</td>
</tr>
<tr>
<td>p.r.n.</td>
<td>- as required or as needed</td>
</tr>
<tr>
<td>psi</td>
<td>- pounds per square inch</td>
</tr>
<tr>
<td>PTB</td>
<td>- primary tuberculosis</td>
</tr>
<tr>
<td>p.v.</td>
<td>- through the vagina</td>
</tr>
<tr>
<td>q.</td>
<td>- every</td>
</tr>
<tr>
<td>q. d.</td>
<td>- every day</td>
</tr>
<tr>
<td>q. h.</td>
<td>- every hours</td>
</tr>
<tr>
<td>q.i.d.</td>
<td>- four times a day</td>
</tr>
<tr>
<td>q.s.</td>
<td>- sufficient quantity</td>
</tr>
<tr>
<td>qt.</td>
<td>- quart</td>
</tr>
<tr>
<td>S.</td>
<td>- subject findings</td>
</tr>
<tr>
<td>SBE</td>
<td>- subacute bacterial endocarditis</td>
</tr>
<tr>
<td>sec</td>
<td>- second</td>
</tr>
<tr>
<td>sed.</td>
<td>- sedentation</td>
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<tr>
<td>SLR</td>
<td>- straight leg raise</td>
</tr>
<tr>
<td>sp. gr.</td>
<td>- specific gravity</td>
</tr>
<tr>
<td>spp.</td>
<td>- species</td>
</tr>
<tr>
<td>SQ</td>
<td>- subcutaneous</td>
</tr>
<tr>
<td>S and S</td>
<td>- signs and symptoms</td>
</tr>
<tr>
<td>stat.</td>
<td>- immediately</td>
</tr>
<tr>
<td>STS</td>
<td>- serologic test for syphilis</td>
</tr>
<tr>
<td>Sx</td>
<td>- symptoms</td>
</tr>
<tr>
<td>T.</td>
<td>- temperature</td>
</tr>
<tr>
<td>tab.</td>
<td>- tablet</td>
</tr>
<tr>
<td>TB</td>
<td>- tuberculosis</td>
</tr>
<tr>
<td>t.i.d.</td>
<td>- three times a day</td>
</tr>
<tr>
<td>TX</td>
<td>- treatment</td>
</tr>
<tr>
<td>U.</td>
<td>- unit</td>
</tr>
<tr>
<td>URI</td>
<td>- upper respiratory infection</td>
</tr>
<tr>
<td>U.S.P.</td>
<td>- United States Pharmacopeia</td>
</tr>
<tr>
<td>VD</td>
<td>- venereal disease</td>
</tr>
<tr>
<td>VS</td>
<td>- vital signs</td>
</tr>
<tr>
<td>W.B.C.</td>
<td>- white blood cell, white blood count</td>
</tr>
<tr>
<td>W.H.O.</td>
<td>- World Health Organization</td>
</tr>
<tr>
<td>wo</td>
<td>- without</td>
</tr>
<tr>
<td>wt.</td>
<td>- weight</td>
</tr>
</tbody>
</table>

**SYMBOLS**

- increase
- decrease
- greater than
- less than
14 July 1982

Holders of ST 31-91B, Special Forces Medical Handbook, should add to/change the text as follows:

**Page**

iv bottom right column, under SYMBOLS, add

- increase
- decrease
- greater than
- less than

1-15 line 2, add ↓ before or in center and right columns

line 11 (Breath sounds & voice), same as for line 2

1-21 bottom page, 2d para from bottom under O, add ↑ before W.B.C. and [before 20,000

1-73 para 1-51 O., first line, add ↓ before B.P.

2-17 mid page, last para before A., 2d & 3d lines, add + sign over -; should read 89±27 & 124±68

D-2 para D-4c, line 3, add ~ over =; should read W.B.C. ≈ 4,500

In addition to the above, users should be aware that superscripts and subscripts in the text are sometimes out of line due to mechanical error.
CHAPTER 1

BODY SYSTEMS

Section I - Integumentary System

1-1. SKIN. Tough elastic structure covering the entire body consisting of two layers: the epidermis and the dermis.

1-2. DIAGNOSIS OF SKIN DISEASES BY PHYSICAL EXAMINATION.

a. Primary lesion. Earliest changes to appear:
   (1) Macule. Flat discolored spot of varied size 10 mm. or smaller.
   (2) Patch. Flat discolored spot of varied size 10 mm. or larger.
   (3) Papule. Solid elevated lesion 10 mm. or smaller.
   (4) Plaque. A group of confluent papules.
   (5) Nodule. Palpable solid lesion 5-10 mm. (may or may not be elevated).
   (6) Tumors. Larger nodules usually 20 mm. or larger.
   (7) Vesicle. Circumscribed elevated lesion 5 mm. or smaller containing serous fluid.
   (8) Bulla. Circumscribed elevated lesion 5 mm. or larger.
   (9) Pustule. Superficial elevated lesion containing pus.
   (10) Wheal. Transient elevated lesion caused by local edema.

b. Secondary lesions result from either evolution (natural) of the primary lesions or patient manipulation of primary lesions.

   (1) Scales. Heaped up parts of epithelium.
   (2) Crusts (Scab). Dried serum, blood, or pus.
   (3) Erosion. Loss of part or all of the epidermis.
   (4) Ulcer. Loss of epidermis and at least part of dermis.
   (5) Excoriation. Linear or hollowed-out crusted area caused by scratching, rubbing, or picking.
   (6) Lichenification. Thickening of the skin with accentuation of the skin markings.
   (7) Atrophy. Thinning and wrinkling of the skin resembling cigarette paper.
1-2

(8) Scar. The result of healing after destruction of the dermis.

1-3. SKIN DISORDERS.

a. Pruritus (Itching).

S. Compulsive itching accompanies primary skin disease or may be the only signs and symptoms.

O. Redness, urticarial papules, excoriated papules, fissures, crusting, etc.

A. Pruritus/Pruritus secondary to _________ skin disease.

P. Correct the skin disease, or discontinue using irritating substance, e.g., soap, clothing, chemical, etc. Use of mild tranquilizers: Valium, Vistaril. Use of major tranquilizers: Thorazine. Use of antihistamines: Benadryl 50 mg. t.i.d.

b. Contact dermatitis is divided into two types:

(1) Primary irritant contact dermatitis. Develops within a few hours, reaches peak severity in 24 hours then disappears; caused by contact with a chemical irritant.

(2) Allergic eczematous contact dermatitis. Has a delayed onset of about 18 hours, peaks in 48-72 hours, and often lasts 2-3 weeks after discontinuing exposure to the offending antigen. (Poison ivy, oak, or sumac or allergy to clothing, etc.)

(3) Symptoms vary from minor itching and redness to vesicles, redness, edema, oozing, crusting, and scaling; itching is usually sharply demarcated.

(4) Remove offending agent. Use tap water, soaks, or compresses. Blisters may be drained but leave the tops on. Oral corticosteroids - Prednisone 40-60 mg./day x 10-14 days in severe cases. Topical corticosteroids are not effective in acute phase. Antihistamines - Benadryl 50 mg. t.i.d.

1-4. BACTERIAL SKIN INFECTIONS.

a. Impetigo/Ecthyma. Superficial vesiculopustular skin infection seen chiefly in children. Ecthyma is an ulcerative form of impetigo.

S. Group A B-hemolytic streptococcus is usual cause, but Staphylococcus aureus may be cultured also.

O. Usually affects arms, legs, and face, with the legs being more susceptible to ecthyma than unexposed areas. Both may follow superficial trauma or may be secondary to skin disease or insect bites, but it is not uncommon for it to arise on normal skin.

Lesions vary from pea-sized vesicopustules to large bizarre circinate ringwormlike lesions that progress rapidly from maculopapules to vesicopustules or bullae to exudative and then to heavily crusted circinate lesions. Ecthyma is characterized by small, purulent, shallow ulcers
covered with crusts. Itching is common and scratching can spread the infection.

A. Impetigo/ecthyma.

P. Systemic antibiotics are superior to topical antibiotics. Penicillin is the drug of choice; second choice is erythromycin.

<table>
<thead>
<tr>
<th></th>
<th>IM Penicillin</th>
<th>ORAL Penicillin</th>
<th>Erythromycin</th>
</tr>
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<tbody>
<tr>
<td>Child</td>
<td>600,000 U. Pen G 125 mg. q.i.d. x 10 days</td>
<td>125 mg. q.i.d. x 10 days</td>
<td></td>
</tr>
<tr>
<td>Adult</td>
<td>1.2 mil U. Pen G 250 mg. q.i.d. x 10 days</td>
<td>250 mg. q.i.d. x 10 days</td>
<td></td>
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</tbody>
</table>

In secondary impetigo, the underlying cause should be treated also. Neglected infection may result in cellulitis, lymphangitis, or furunculosis in adults or acute glomerulonephritis in children.


S. The face (bilaterally), an arm, or a leg is most often involved.

O. Lesion is well demarcated, shiny, red, edematous, and tender; vesicles and bullae often develop. Patches of peripheral redness and regional lymphadenopathy are seen occasionally; high fever, chills, and malaise are common. It may be recurrent and may result in chronic lymphedema. The causative agent may be difficult to culture from the lesion, but it may be cultured from the blood.

A. Erysipelas. NOTE: Erysipelas of the face must be differentiated from herpes zoster; contact dermatitis and angioneurotic edema may also be mistaken for erysipelas.

P. Pen VK or erythromycin 250 mg. q.i.d. x 14 days. In acute cases Pen G 1.2 million U. IV q.6h. x 36-48 hrs then start Pen VK. Local discomfort may be relieved by cold packs and/or 600 mg. aspirin with 30 mg. codeine.

c. Cellulitis. Has the same S and S and is treated the same as erysipelas. The only difference is cellulitis involves deeper tissue.

d. See Chapter 2, Section III, Bacterial, for typhoid fever, gas gangrene, anthrax, tularemia, plague, leprosy, and scarlet fever.

1-5. SUPERFICIAL FUNGAL INFECTIONS.

a. See Chapter 2, Section II, Mycotic, for coccidioidomycosis, North American blastomycosis, and Paracoccidioidomycosis (South American blastomycosis).

b. Sporotrichosis. A chronic fungal infection caused by Sporothrix schenckii. It is found worldwide in soil, plants, and decaying wood. Organism is introduced by skin trauma, usually on hand, arm, or foot.

S. and O. Commonly begins with a hard, nontender subcutaneous module that later becomes adherent to the overlying skin, ulcerates (chancriform), and may persist for a long time. Within a few days to
weeks, similar modules usually develop along the lymphatics draining this area, and these may ulcerate. The lymphatic vessels become indurated and are easily palpable. Infection usually ceases to spread before the regional lymph nodes are invaded, and blood-bone dissemination is rare.

Skin infection may not spread through the lymphatics but may appear only as warty or papular scaly lesions that may become pustular. Disseminated sporotrichosis presents as multiple, hard subcutaneous modules scattered over the body. These become soft but rarely rupture spontaneously. Lesions may also develop in bones, joints, muscles, and viscera.

Laboratory findings: Cultures are needed to establish diagnosis.

A. Sporotrichosis.

P. Saturated solution of potassium iodine (S.S.K.I.) 5 drops in a glass of water t.i.d., after meals, orally, increasing by 1 drop per dose until 40 drops t.i.d. are being given. Continue until signs of active disease have disappeared. Then decrease the dosage by 1 drop per dose until 5 drops per dose are being given, then discontinue. Although S.S.K.I. is not fungicidal, it does promote rapid healing. Care must be taken to reduce the dosage if signs of iodism appear.

Amphotericin B IV and miconazole have been effective in systemic infections.

c. Chromomycosis. Mainly a tropical chronic cutaneous infection caused by several species of closely related molds having a dark mycelium. Found in soil and on decaying vegetation. In humans the disease progresses slowly, occurring most frequently on the lower extremities, but it may occur on hands, arms, and elsewhere.

S. and O. Lesions begin as a papule or ulcer. Over a period of months to years, the lesions enlarge to become vegetating, papillomatous, verrucous, elevated nodules with a cauliflower-like appearance or widespread dry verrucous plaques. The latter spread peripherally with a raised, verrucous border, leaving central atrophic scarring. The surface of the border contains minute abscesses. Satellite lesions may appear along the lymphatics. There may be a foul odor due to secondary bacterial infection. Some patients complain of itching. Elephantiasis may result if marked fibrosis and lymph stasis exist in the limb.

Lab findings: The fungus is seen as brown, thick-walled, spherical, sometimes septate cells in pus.

A. Chromomycosis.

P. Flucytosine - 150 mg./kg./d. orally or thiabendazole 25 mg./kg./d. orally. Surgical excision and skin grafting may prove useful.

d. Dermatophyte infections (Ringworm). Superficial infections caused by fungi that invade only dead tissues of the skin or its appendages (stratum corneum, nails, hair).

S. Microsporum, Trichophyton, and Epidermophyton are the genera most commonly involved.
Some dermatophytes produce only mild or no inflammation. In such cases, the organism may persist indefinitely, causing intermittent remissions and exacerbations of a gradually extending lesion with a scaling, slightly raised border. In other cases, an acute infection may occur typically causing a sudden vesicular and bullous disease of the feet, or an inflamed boggy lesion of the scalp (Kerion) may occur that is due to a strong immunologic reaction to the fungus; it is usually followed by remission or cure.

A. Tinea corporis - (Ringworm of the body).
Tinea pedis - (Ringworm of the feet) - athlete's foot.
Tinea unguium - (Ringworm of the nails).
Tinea capitis - (Ringworm of the scalp) - dandruff.
Tinea cruris - (Ringworm of the groin) - jock itch.
Tinea barbae - (Ringworm of the beard area).
Tinea manuum - (Ringworm of the palms and soles of the feet).

Differential diagnosis: Includes pityriasis rosea, discoid eczema, and psoriasis.

Confirmation can be made with Wood's light or KOH preparation.

P. Griseofulvin is effective against true dermatophyte infections, but not against candidiasis or tinea versicolor. Adult dosage is 500 mg. b.i.d. with meals. Duration varies from 2 weeks for tinea corporis to 6-12 months for tinea unguium. Tinactin/Mycostatin are effective against most fungal infections where applied b.i.d. to t.i.d. to affected areas and washed off before reapplication.

1-6. PARASITIC SKIN INFECTIONS.

a. Scabies. A transmissible parasitic skin infection characterized by superficial burrows, intense pruritus, and secondary infections.

S. Caused by the itch mite (Sarcoptes scabiei). The female mite tunnels into the epidermis layer and deposits her eggs along the burrow. Scabies is transmitted by skin-to-skin contact with an infected person. It is not transmitted by clothing or bedding.

O. Nocturnal itching, pruritic vesicles and pustules in "runs" or "galleries" especially on the sides of the fingers and the heel of the palms. Mites, ova, and black clots of feces may be visible microscopically.

A. Scabies. Confirm by demonstrating the parasite in scrapings taken from a burrow, mix with any clear fluid, and examine microscopically.

P. Disinfestation with gamma Kwell 1% cream base applied from neck down and repeated in one week. (WARNING: there is a potential of neurotoxicity from use on infants and from overuse on adults.) Treatment
should be aimed at all infected personnel. In cases of severe secondary infections, treatment should be supplemented with systemic and topical antibiotics.

b. Pediculosis (Lice). A parasitic infestation of the skin—scalp, trunk, or pubic areas—that usually occurs in overcrowded dwellings.

S. Head and pubic lice can be found on the head and in the pubic area. Body lice are seldom found on the body as the insects only come to the skin to feed; you must look for them in the seams of clothing.

O. Pruritis with excoriation, nits (ova) on hair shafts, lice on skin or clothing, occasionally sky-blue macules (maculae caeruleae) on the inner thighs or on the lower abdomen in pubic lice infestations. You may also see secondary infections.


P. Cure is rapid with gamma Kwell 1% q.d. x 2 days. Repeat after 10 days to destroy the nits; practice good personal hygiene. If the infestation is widespread, wash all clothing and bedding in hot water with a strong detergent and dust the area with lindane powder.

c. See Chapter 2, Section 1, Parasitic, for African trypanosomiasis (sleeping sickness), American trypanosomiasis (Chagas' disease), and cutaneous and mucocutaneous leishmaniasis.

1-7. VIRAL INFECTIONS OF THE SKIN.

a. Herpes simplex (cold/fever sore). An acute viral infection.

S. Clinical outbreaks, which may be recurrent in the same location for years, are provoked by fever, sunburn, indigestion, fatigue, windburn, menstruation, or nervous tension.

O. Recurrent, small, grouped vesicles on an erythematous base, especially around the oral and genital area, lasting approximately 1-2 weeks. Regional lymph nodes may be swollen and tender. Burning and stinging; neuralgia may precede and accompany attacks. The lesions consist of small, grouped vesicles that may occur anywhere, but most often occur on the lips, mouth, and genitals.

A. Herpes simplex. Differential diagnosis: Distinguish from other vesicular lesions, especially herpes zoster and impetigo, in the genital area, syphilis, lymphogranuloma venereum, and chancreoid.

COMPLICATIONS: Kaposi's varicelliform eruptions (eczema herpeticum or disseminated herpes simplex), encephalitis, keratitis, and perhaps cervical cancer and other neoplastic diseases.

P. Eliminate precipitating agents when possible. Apply a moistened styptic pencil several times daily to abort lesions. Dust vesicles twice daily with bismuth formic iodide or use shake lotions or camphor spirit. Epinephrine 1:1,000 applied locally b.i.d. may also be used. If there is associated cellulitis and lymphadenitis, apply cool
compresses. Treat stomatitis with mild saline mouthwash.

b. Herpes zoster (Shingles). An acute vesicular eruption due to a virus that is morphologically identical with the varicella virus.

S. Usually occurs in adults with or without a history of chickenpox during childhood and is probably a reactivation of a varicella virus infection that has been occult for many years. Persons in anergic states (Hodgkin's disease, lymphomas, or those taking immunosuppressive drugs) are at greater risk, and life-threatening dissemination (varicella) may occur.

O. Pain along the course of a nerve followed by painful groups of vesicular lesions. Involvement is unilateral and persists for approximately 2-3 weeks. Lesions are usually on the face and trunk. Swelling of regional lymph nodes may occur. Pain usually precedes eruptions by 48 hours or more and may persist and actually increase in intensity after the lesions have disappeared.

A. Herpes zoster. Differential diagnosis: Poison ivy, poison oak dermatitis, and herpes simplex, which is usually less painful.

COMPLICATIONS: Persistent neuralgia, anesthesia of the affected area following healing, facial or other nerve paralysis, and encephalitis may occur.

P. Barbiturates may help control tension and nervousness associated with neuralgia. Aspirin with or without codeine (30 mg.) usually controls the pain. A single injection of triamcinolone acetonide (Kenalog) suspension (40 mg. intraglutely) may give prompt relief. Prednisone 40 mg. daily for 4 days and then continued in declining doses may also be used. Calamine lotion or other shake lotions are often of value; apply liberally and cover with a protective layer of cotton. DO NOT USE GREASES.

c. See Chapter 2, Section IV, Viral, for measles, smallpox, dengue, Colorado tick fever, and herpes genitalis.

d. See Chapter 6, Pediatrics, for chickenpox.

1-8. RICKETTSIAL DISEASES. See Chapter 2, Section V, Rickettsial and Spirochetal, for epidemic louse-borne typhus, endemic flea-borne typhus, and spotted fevers (Rocky Mountain spotted fever, Rickettsialpox, scrub typhus, trench fever, Q fever).

1-9. SPIROCHETAL DISEASES.

a. See Chapter 2, Section VI, Venereal for syphilis.

b. See Chapter 2, Section V, Rickettsial and Spirochetal, for treponemal infections (yaws, endemic syphilis, pinta).
1-10. GENERAL.

a. The history of a musculoskeletal disorder is much like any other history. A concise story of specific complaints will help the medic best determine the extent of the disorder. Questions should include chronological sequence, manner of onset, duration of symptoms, previous history, progress of the complaint, extent of disability, specific complaint of weight bearing, motion of the part, weather changes, what aggravates the complaint, what relieves it, whether it has ever been treated, and if so, what were the effects of treatment.

b. The physical examination should include the general posture and alignment of the body as a whole. Evaluate the patient's body attitude while standing and walking. The relationship of the feet to the legs and of the hips to the pelvis should be noted; also the relationship of the arms to the shoulder girdle and to the upper trunk. Next the general contour of the spine and its relation to the shoulder girdle, thorax, and pelvis should be noted. The local physical examination should include:

1. Inspection. Contour, appearance, color, deformity, and its general relationship to the body.

2. Palpation. Tenderness, swelling, muscle spasm, local temperature changes, and gross alterations.

3. Range of motion. Motion is measured in degrees of a circle as illustrated below. Medic should compare affected area with uninvolved opposites or with his own joints.

4. Joint position. Position of function is the position that gives the joint its maximum strength and efficiency. Position of comfort is the position in which the joint feels the most comfortable. Patients will always try to assume the position of comfort. It is up to the medic to insure that the affected joints are always supported in a position of function.

5. Measurement. Atrophy or hypertrophy may be determined by measuring and comparing with uninvolved opposite.
Neurologic. The strength of the affected muscles and the quality of the superficial and deep tendon reflexes should be noted. Also the integrity of cutaneous sensation should be determined when indicated.

1-11. RHEUMATOID ARTHRITIS. Chronic systemic disease of unknown etiology usually involving the synovial membranes of multiple joints, tendons, or bursae.

S. and O. Common in ages 25-50; women are affected three times as often as men. Abrupt onset with symmetrical swelling of joints in the hands and feet, regional atrophy of bone and muscle, limited joint motion, the skin of the extremities may be smooth, glossy, and atrophic. Other signs and symptoms include elevated temperature, tachycardia, generalized lymphadenopathy, malnutrition, body wasting, morning stiffness, and depression. Synovial fluid is cloudy and sterile, reduced viscosity. Polymorphonuclear leukocytes typically predominate. History should rule out other types of arthritis.

A. Rheumatoid arthritis.

P. Rest, aspirin in high doses (look out for ulcer), corticosteroids, either systemically and/or intra-articular injection. Severe rebound may follow steroid withdrawal. Heat and physical therapy to maintain joint function.

1-12. OSTEOARTHRITIS. A degenerative joint disease usually affecting large weight-bearing joints of older individuals, causing deterioration of articular cartilage.

S. and O. Onset is gradual and localized to a few joints; 60-70-year age bracket; women affected 10 times as often as men; distal interphalangeal joints of the fingers frequently show modulation, obesity; pain is made worse by exercise. The cervical and lumbar spine, hip, and knee are most often involved. History, physical, laboratory findings will show minimal abnormalities.

A. Osteoarthritis.

P. Rest, weight reduction, heat, occasional brace support, aspirin, analgesics, and physical therapy.

1-13. SEPTIC ARTHRITIS. Acute disease process involving a single joint and is secondary to a bacterial infection.

S. and O. Previously healthy, case of gonorrhea usually in women, concurrent bacterial infection, fever, rash possibly, acute joint pain and stiffness, joint is warm, tender, swollen. Leukocytosis, arthrocentesis will show color to be variable, viscosity variable, clarity opaque, culture often positive, Gram's stain, W.B.C. greater than 10,000.

A. Septic arthritis.

P. Evacuate if possible; the joint may be destroyed if not promptly treated. Treat with antibiotics according to infectious organism.

1-14. GOUTY ARTHRITIS. Recurrent metabolic disease usually causing arthritis in peripheral joints due to hyperuricemia that leaves urate crystals within the joint space.
S. and O. Minor trauma may start; overindulgence in pork or
alcohol; classically the joint of the big toe is affected; inflammation,
pain, swelling, fever, chills, tachycardia; urate salts may precipitate in
a collection called a tophus that may be mistakenly reported as
calcification. These tophi may be found in the muscle surrounding the
joint, the tendons, or the walls of the bursae. Usually made by history
and physical. Synovial fluid will have needle-shaped urate crystals that
are free in the fluid.

A. Gouty arthritis.

P. Terminate the acute attacks by the use of an
anti-inflammatory drug, prophylaxis by daily use of colchicine, and
prevention of further deposits of urate crystals by lowering uric acid
levels with Benemid or allopurinol. Codeine may be needed to control pain.

1-15. OSTEOMYELITIS. An infection of the bone and bone marrow due to
septicemia or bacteremia.

S. and O. Infected tonsils, boils, abscessed teeth, or upper
respiratory infections may cause the septicemia. Direct contamination may
result from open fracture or war wound. General symptoms are those of an
acute toxic illness with sharp rise in temperature. Locally the involved
area may be swollen, warm, and very tender to touch. There may be a
severe, constant, pulsating pain, usually aggravated by motion. The
diagnosis of acute osteomyelitis ideally requires the identification of the
causative agent. Staphylococcus aureus is the most common, accounting for
65-70 percent of the cases. Proteus, pseudomonas, salmonella,
streptococcus, acid-fast bacilli, fungi, and rickettsiae can also be the
cause. Blood test will usually show an elevated leukocyte count and blood
culture may be positive.

A. Osteomyelitis.

P. The successful treatment is completely dependent upon
establishing an early clinical and bacterial diagnosis. Antibiotics are
started as soon as diagnosis is suspected and may be altered after the
results of the culture and sensitivity are known. Penicillin G with doses of
12-20 million units daily and 1-8 grams of methicillin daily, depending
on patient's age. For patients that are allergic to penicillin,
cephalosporin, erythromycin, or lincomycin may be given. Antibiotics
should be continued for 8-12 weeks after all signs and symptoms disappear.
The affected bone should be immobilized until all signs of active infection
have disappeared. Aspiration of abscess may also be necessary. Chronic
osteomyelitis requires surgery with radical debridement of the bone with
excision of all sinuses, dead bone, scar tissue, and necrotic tissue.

1-16. BURSITIS. Inflammation of the bursa. Bursae are lubricating
devices that diminish the friction of movement. They are found beneath the
skin, beneath tendons, and overlying joints. Inflammation may be due to
trauma, extensive use, infection, gout, or rheumatoid arthritis. Due to
the stimulus of inflammation, the lining membrane produces excess fluid
causing distension of the bursa sac. The fluid may be bloody or in the
case of gout, there may be urate crystals. Treatment consists of local
injections of corticosteroids into the inflamed bursa. Treatment of
choice is 20-40 mg. hydrocortisone following infiltration of 1% procaine.
Phenylbutazone 300 mg. for 2-3 days followed by 100 mg. for 10 days is also
effective. Early active movement inhibits development of limiting
1-17. ARTHROCENTESIS. Find the effusion. Mark the site for entry. Scrub with Betadine or iodine. Anesthetize the skin 1% lidocaine. Aspirate with 20-gage needle; insure needle is long enough. Record the volume, viscosity, color, and clarity of synovial fluid. Immediately place 0.5 ml. in sterile tube for culture with Thayes-Martin medium. Place 0.5 ml. of synovial fluid in a heparinized tube for leukocyte count. Use 0.3% saline solution as diluent for W.B.C. Prepare smears for Wright's and Gram's stain. Prepare wet smear by placing drop of synovial fluid on slide, cover with cover slip, and seal edges with nail polish.

1-18. THE SHOULDER. Shoulder pain may arise from a problem primarily in the joint or it may be referred pain. Referred pain may be due to cervical spine disorders, cardiac disorders, gallbladder diseases, or diseases involving the mediastinum or diaphragm. Referred pain will less likely have local tenderness, inflammation, and limited range of motion.
1-19. THE KNEE.

a. Collateral ligament rupture test. With the knee partially flexed, an abnormal opening of the medial aspect of the knee indicates damage to the medial collateral ligament. If the lateral collateral ligament has been injured there will be an opening on the lateral aspect of the knee.

b. Cruciate ligament rupture test. With both knees flexed, the medic grasps the leg just below the knee with both hands and pulls the tibia forward. For best results the medic should place his hip on the patient's foot. Abnormal forward motion of the tibia suggest damage to the anterior cruciate ligaments. Abnormal backward motion of the tibia suggests damage to the posterior cruciate ligaments.

c. McMurray's test for torn meniscus. The patient should be lying in the supine position with the knee fully flexed. The foot is forcibly rotated outward to its full capacity. While the foot is held outward in the rotated position, the knee is slowly extended. If a painful click is felt, this indicates a tear of the medial meniscus. If the painful click is felt when the foot is rotated inward, the tear is in the lateral meniscus.

1-20. LOW BACK PAIN. A thorough knowledge of the anatomy of the spine, particularly of the lumbosacral area, is essential to the diagnosis and treatment of low back pain. Low back pain may be due to congenital disorders, tumors, trauma, metabolic disorders, inflammatory diseases, degenerative diseases, infections, mechanical causes, or psychoneurotic disorders. This does not end the list. Trauma is the most common cause of back pain. A study of the presented disorders will help the medic in his differential diagnosis. General treatment consists of bed rest, heating
pads, firm mattress, massage, and possibly a local anesthetic infiltration to trigger points.

a. The malingerer. Malingerers exist, but every patient should be treated as a true patient until other evidence exists.

b. The tests.

(1) Have the patient sit in a chair and try to touch the floor; a patient with a severe disc herniation can usually perform while the malingerer cannot.

(2) Place the patient in the supine position. Put one hand under the heel and raise the opposite leg. A malingerer will usually lift his heel out of the medic's hand while the legitimate patient will press further into the hand.

(3) The malingering patient usually exhibits a marked withdrawal response when the medic palpates any part of his body. Squeezing the sacroiliac joints by compression from both sides usually elicits pain from the patient who is faking and not from the true patient.

(4) Muscle weakness in the injured side is usually too obvious and disproportionate to the neurological findings in the malingerer. The best course of action is to tell the patient that no organic cause can be found for the patient's symptoms.
The respiratory system includes the nasal pharynx, sinuses, trachea, bronchial tree, lungs, pleura, diaphragm, and the chest wall.

The upper portion of the respiratory system is covered in Chapter 1, Section IX, EENT.

1-21. PNEUMOTHORAX: The presence of air in the pleural cavity resulting in partial or total collapse of the lung.

S. Closed pneumothorax: No direct communication between pleural cavity and the atmosphere.

(1) Spontaneous pneumothorax: Due to rupture of a bleb at the surface of the lung lining. Most common in otherwise healthy males between 20-30 years of age. Sudden onset of progressive dyspnea is the most common complaint. Chest pain of variable quality (but usually pleuritic) is frequently associated. The rupture often occurs during exercise, coughing, sneezing, or straining, and the patient can usually pinpoint the onset of dyspnea to the second. The progression is usually rapid, and the patient may find himself in severe respiratory distress in minutes. The course, however, may be less acute and the patient may note only slowly increasing dyspnea on exertion for days prior to onset of frank dyspnea at rest. The chest pain is usually localized to the affected side.

(2) Tension pneumothorax: Due to rupture of a small bronchus, bronchiole, or alveolus. This results in the formation of a one-way valve that allows inspired air to enter but prevents its escape. The progressive increase in pressure from the trapped air buildup pushes the heart to the opposite side and compresses the univalved lung and great veins resulting in a decreased cardiac output. The symptoms are the same as spontaneous pneumothorax but far more rapid in progression. The chest pain usually localizes well to the affected side, initially, but may become more diffuse as the contralateral lung is involved.

O. General: The patient is usually anxious and tachypneic. Signs of varying degrees of shock may be present depending on the type and extent of the pneumothorax. The same can be said for cyanosis.

Vital Signs: Temperature is usually normal but may be subnormal if severe degree of shock is present. Pulse is usually increased and feeble. Respiration is tachypneic.

B.P.: A postural drop may be noted with significant cardiovascular compromise; a persistently low or falling supine B.P. will be seen as shock becomes more developed.
<table>
<thead>
<tr>
<th>Chest Exam:</th>
<th>Spontaneous</th>
<th>Tension or Open</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chest expansion</td>
<td>or absent on affected side.</td>
<td>or absent on affected side greater than uninvolved side (which may also demonstrate poor expansion)</td>
</tr>
<tr>
<td>Resonance to percussion</td>
<td>Involved side&gt;uninvolved side</td>
<td>Involved side&gt;uninvolved side</td>
</tr>
<tr>
<td>Breath sounds &amp; voice sounds</td>
<td>or absent on involved side</td>
<td>or absent on involved side</td>
</tr>
<tr>
<td>Fremitus</td>
<td>Absent</td>
<td>Absent</td>
</tr>
<tr>
<td>Tracheal deviation</td>
<td>Usually none</td>
<td>When present, is away from affected side.</td>
</tr>
<tr>
<td>P.M.I. shift</td>
<td>Usually none</td>
<td>When present, is away from affected side.</td>
</tr>
<tr>
<td>Tracheal &amp; P.M.I. &quot;swing&quot;</td>
<td>Insp: Toward involved side</td>
<td>Insp: Away from involved side</td>
</tr>
<tr>
<td>(a pendulum type motion of the heart &amp; trachea during expiration and inspiration is often seen in pneumothorax).</td>
<td>Expir: Away from involved side</td>
<td>Exp: Toward involved side</td>
</tr>
</tbody>
</table>

Subcutaneous emphysema: Air in the subcutaneous tissues about the neck and chest usually indicates an underlying pneumothorax.

A. Pneumothorax. Differential diagnosis: May mimic many acute thoracic events including pulmonary embolus and MI. The specific features of demonstrable hyperresonance with associated poor expansion of one side of the chest will usually differentiate a pneumothorax. Nonetheless, a quick rule of other possible causes should be done.

P. Closed pneumothorax:

(1) Spontaneous - Tube thoracostomy with drainage:

(a) At the 3rd or 4th intercostal space just medial to the anterior axillary line, make a short skin incision just above and roughly parallel to the inferior rib of the interspace.

(b) Use large hemostats to separate the muscles and puncture the pleura.

(c) With the hemostats, introduce a large bore Foley catheter into the pleural space with the tip pointing superiorly (if a chest tube is available, use it).

(d) The tube should be inserted 1/2 to 3/4 of its length and the balloon inflated. The catheter is then slowly pulled outward until the inflated balloon "catches" on the inner chest wall. During this time the patient should be urged to cough and strain to allow removal of pleural fluid. Once the catheter catches, it is secured with sutures. A vertical mattress suture wrapped around the tube is preferred.