

Implementation

- A. Consider the Needs and Limitations of the Individual: 1. psychomotor, 2. cognitive, 3. affective (Competencies or Deficiencies in one of these areas affects the other two)
- B. Consider the facilities and equipment of the environment (camp, school, clinic etc.)
- C. Concern and imagination of the teacher: Essential for implementation of Indicated Programming.

Five major developmental goals or objectives of physical education:

- Neuromuscular: A harmonious functioning of the nervous and muscular systems to produce desired movements
- Organic: Proper functioning of the body systems so that the individual may adequately meet the demands placed upon him by his environment.
- Interpretive: The ability to explore, to discover, to understand, to acquire knowledge, and to make value judgments.
- Social: An adjustment to both self and others by an integration of the individual to society and his environment
- Emotional: A healthy response to physical activity through a fulfillment of basic needs.

Spinal Cord

- The spinal cord lies within the vertebrae of the spinal column
- As you descend the body the vertebrae get larger and support more weight
- The spinal column is designed for mobility (series of unfused bones-not very stable)
- Stability is provided by the ligaments that attach vertebrae
- In terms of stability:
 - Sacrum > Thoracic > Lumbar > Cervical
- In terms of mobility exactly the opposite is true:
 - Cervical > Lumbar > Thoracic > Sacrum



Cervical
vertebrae
(1-7)

Thoracic
vertebrae
(1-12)

Lumbar
Vertebrae
(1-5)

Sacrum
(fused
vertb.)

Coccyx

Spinal Cord Injury

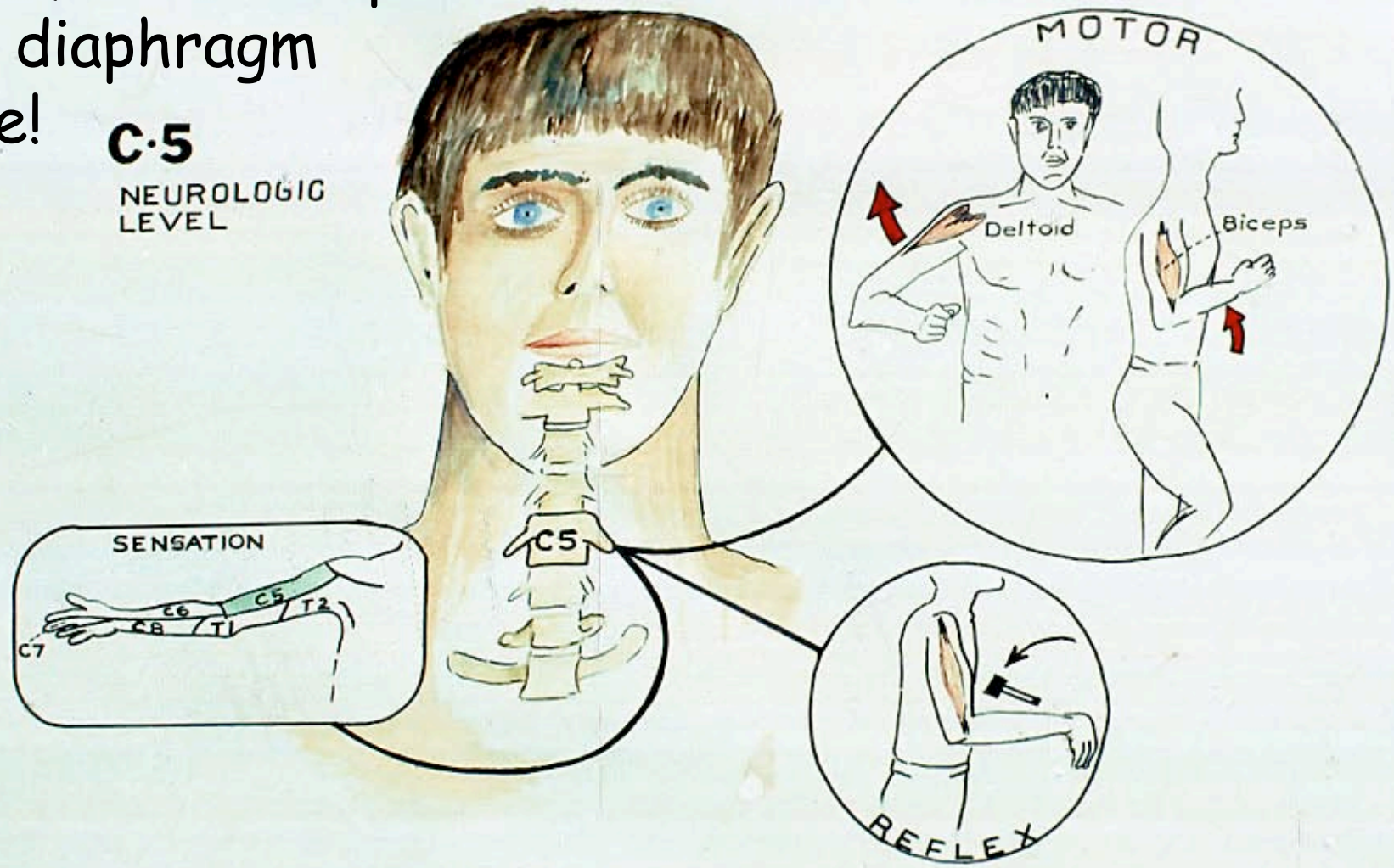
- ~Our spinal cord is consistency of ripe banana = easily bruised
- ~Central Nervous System Neurons do not regenerate: significant bruising = permanent injury
- ~Traumatic Paraplegia or quadriplegia result from direct injury to the spinal cord, or indirectly from surrounding tissue damage and effusion (swelling).

Spinal Cord Injury

- ~Essentially, body parts receiving innervation below the lesion (injury) will present with motor and sensory deficit. Assuming there is no further injury, the areas of the body receiving innervation from above the lesion will remain unaffected and intact.
- ~Complete injury: all motor and sensory function from lesion down has ceased
- ~Incomplete lesion: some motor and/or sensory function remains intact.

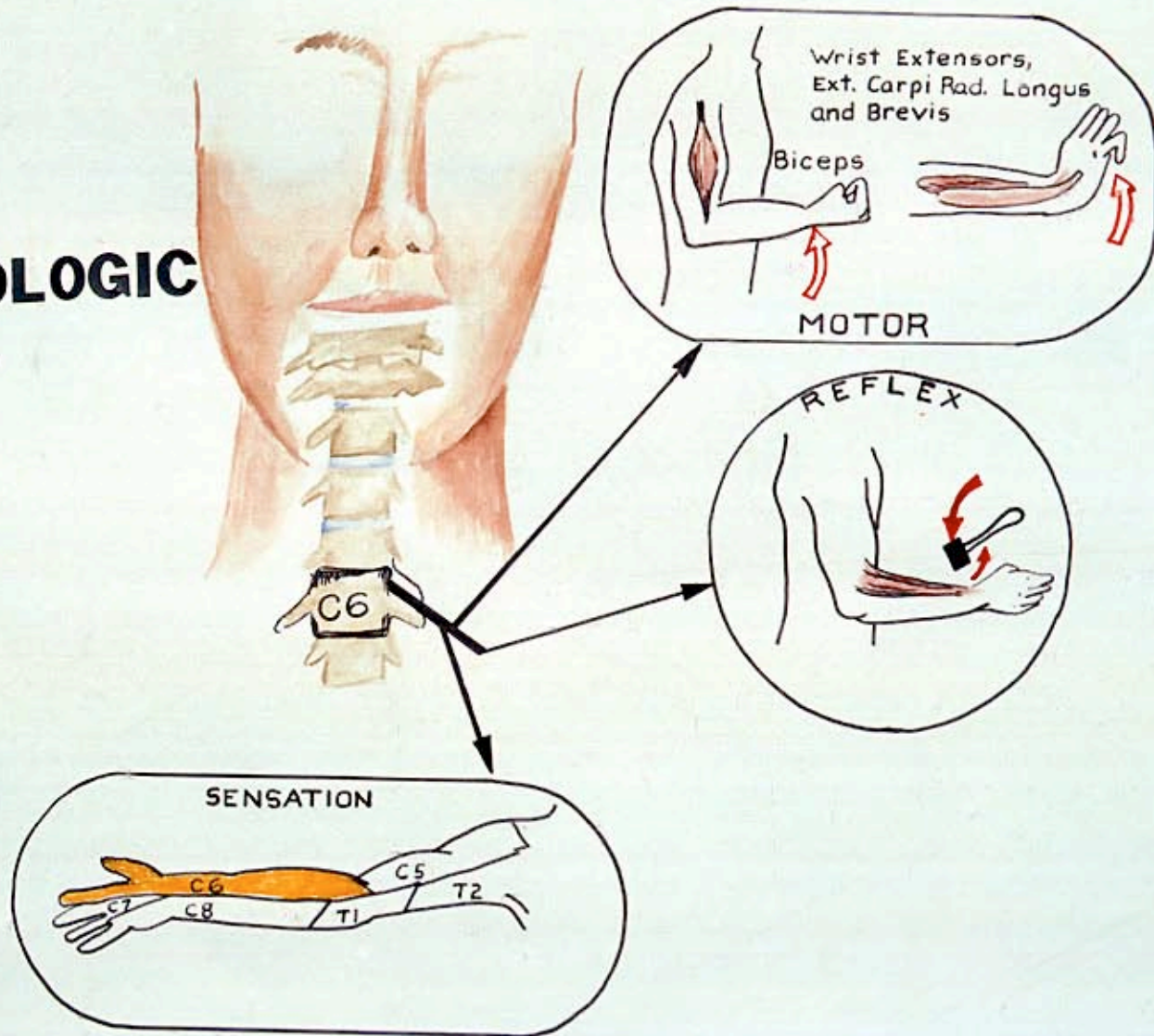
C3, 4, and 5 keep
the diaphragm
alive!

C-5
NEUROLOGIC
LEVEL



PHYSICAL EXAMINATION OF THE CERVICAL SPINE

C6 NEUROLOGIC LEVEL



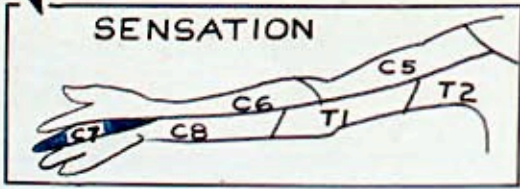
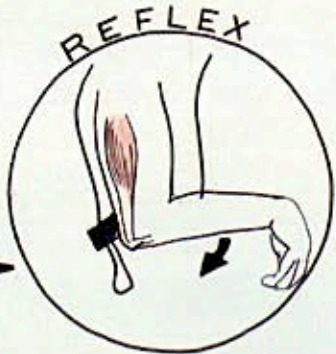
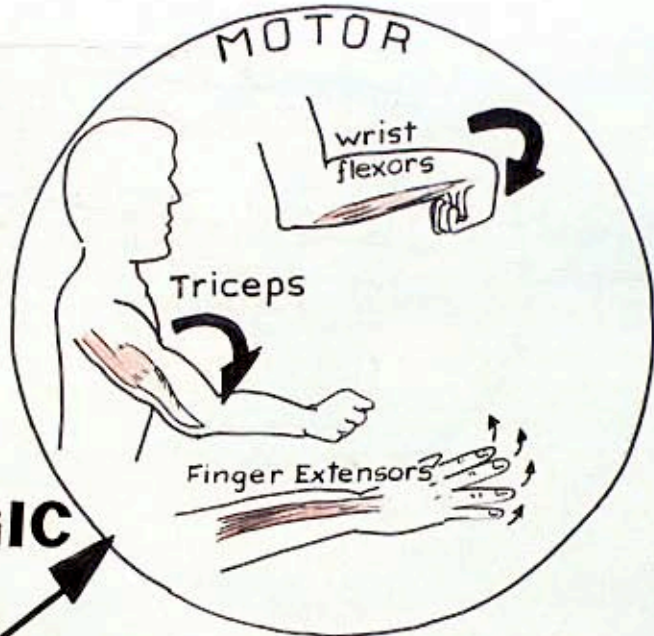
Two maneuvers that prevent pressure sores:

~Push ups (triceps: need C7)

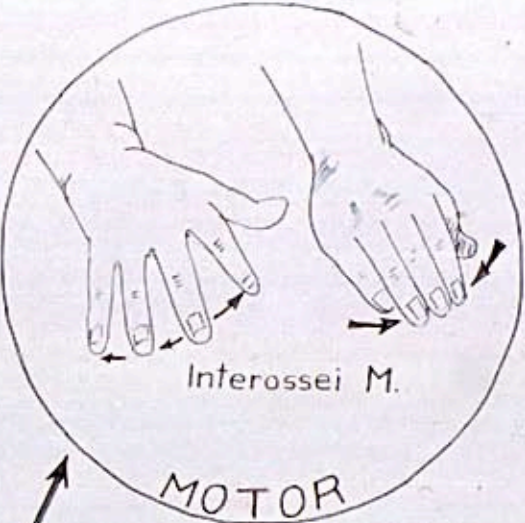
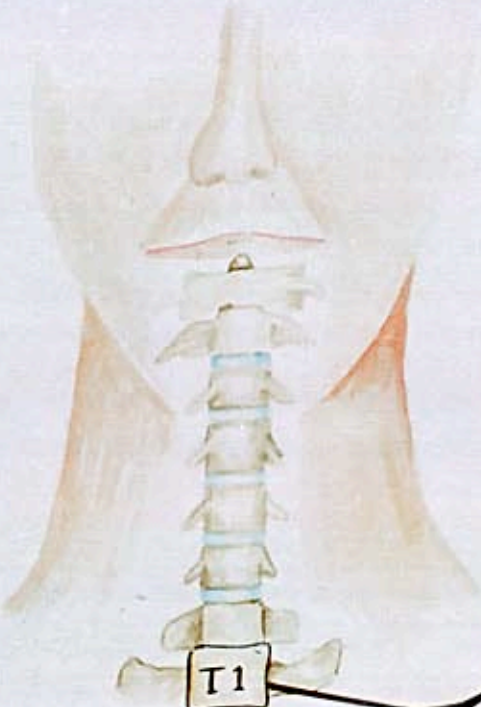
~Pressure releases



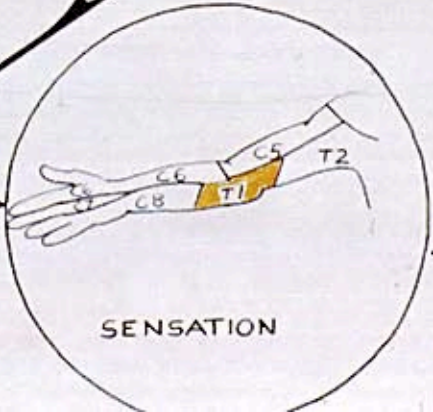
**C7
NEUROLOGIC
LEVEL**



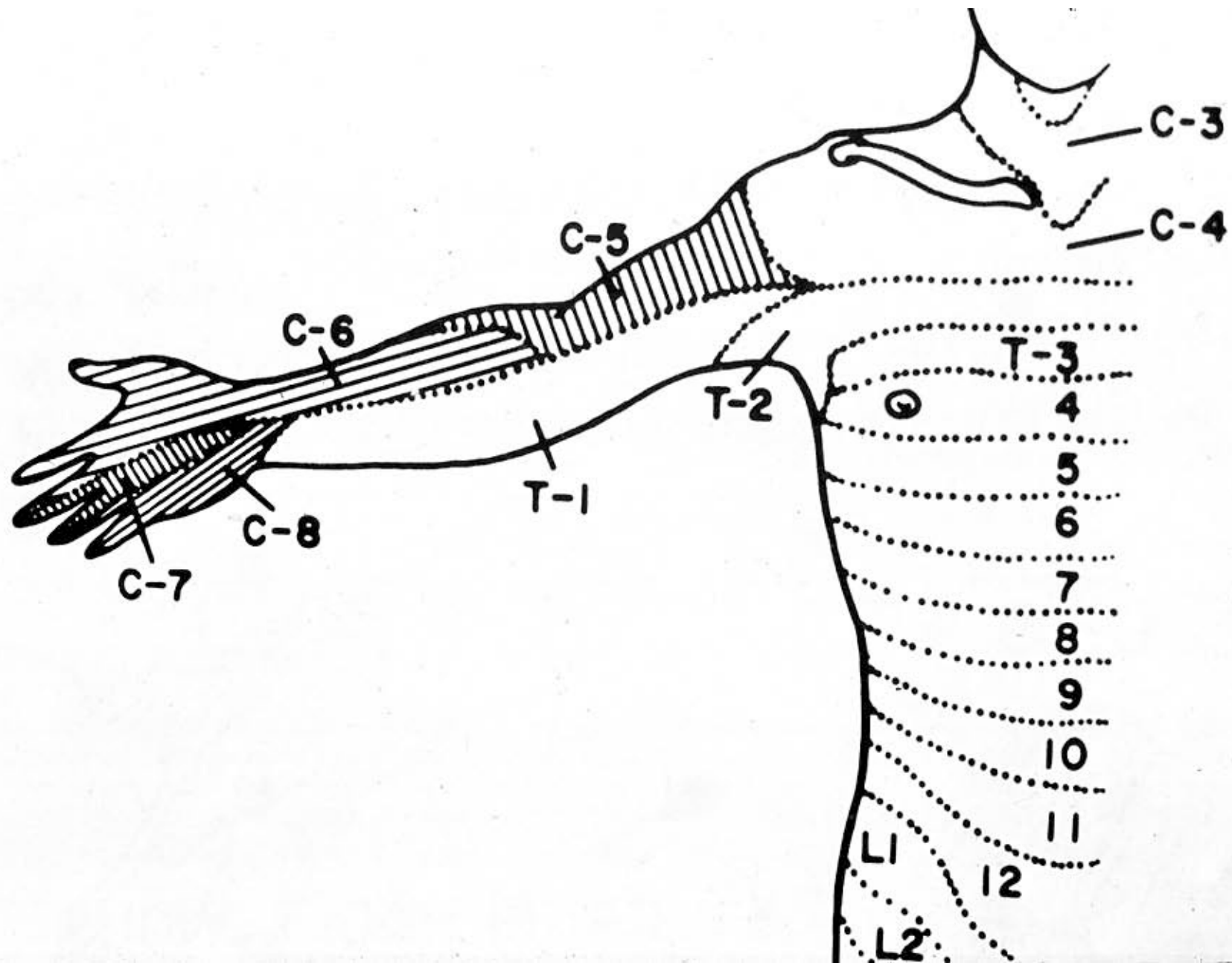
T1 NEUROLOGIC LEVEL

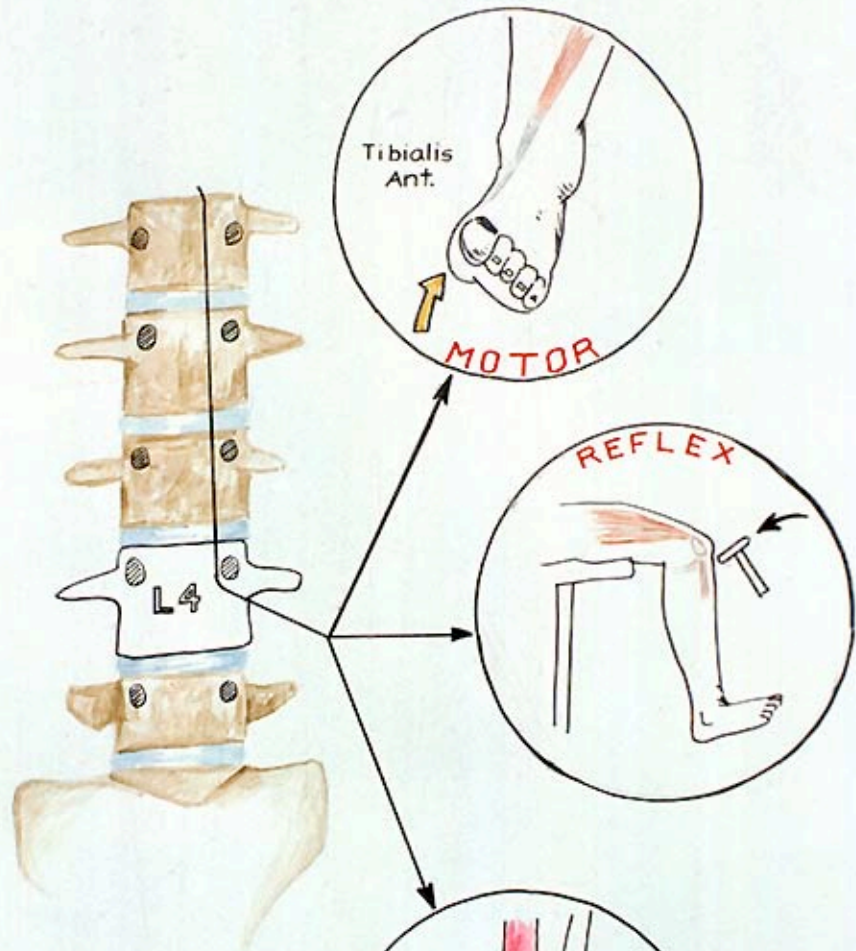


REFLEX 
NONE



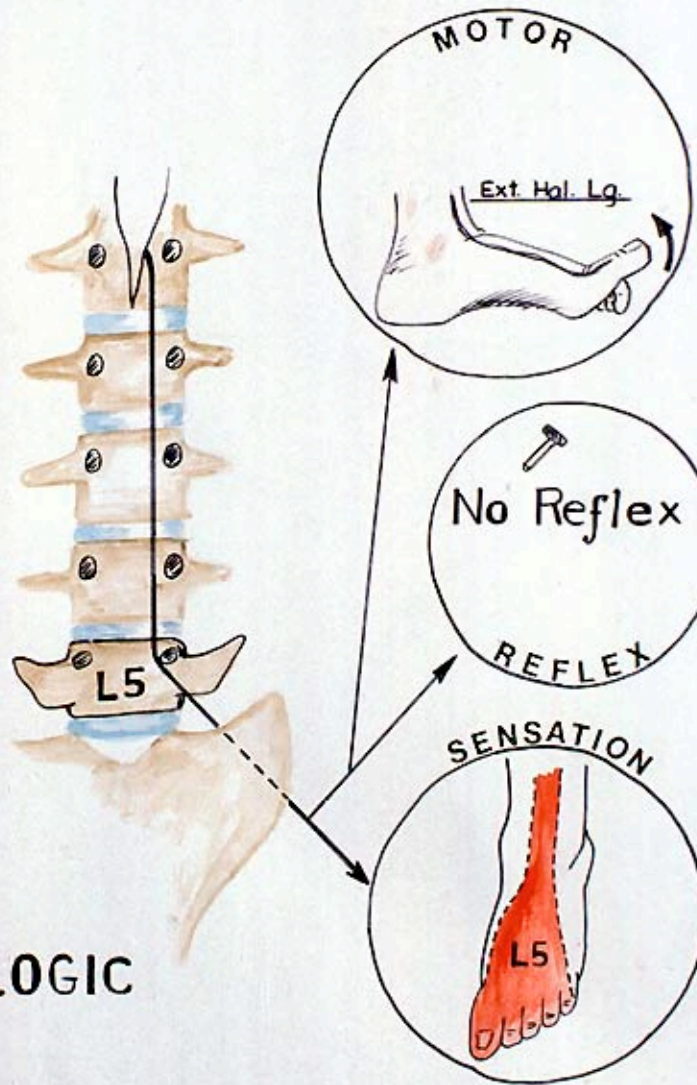
SENSATION



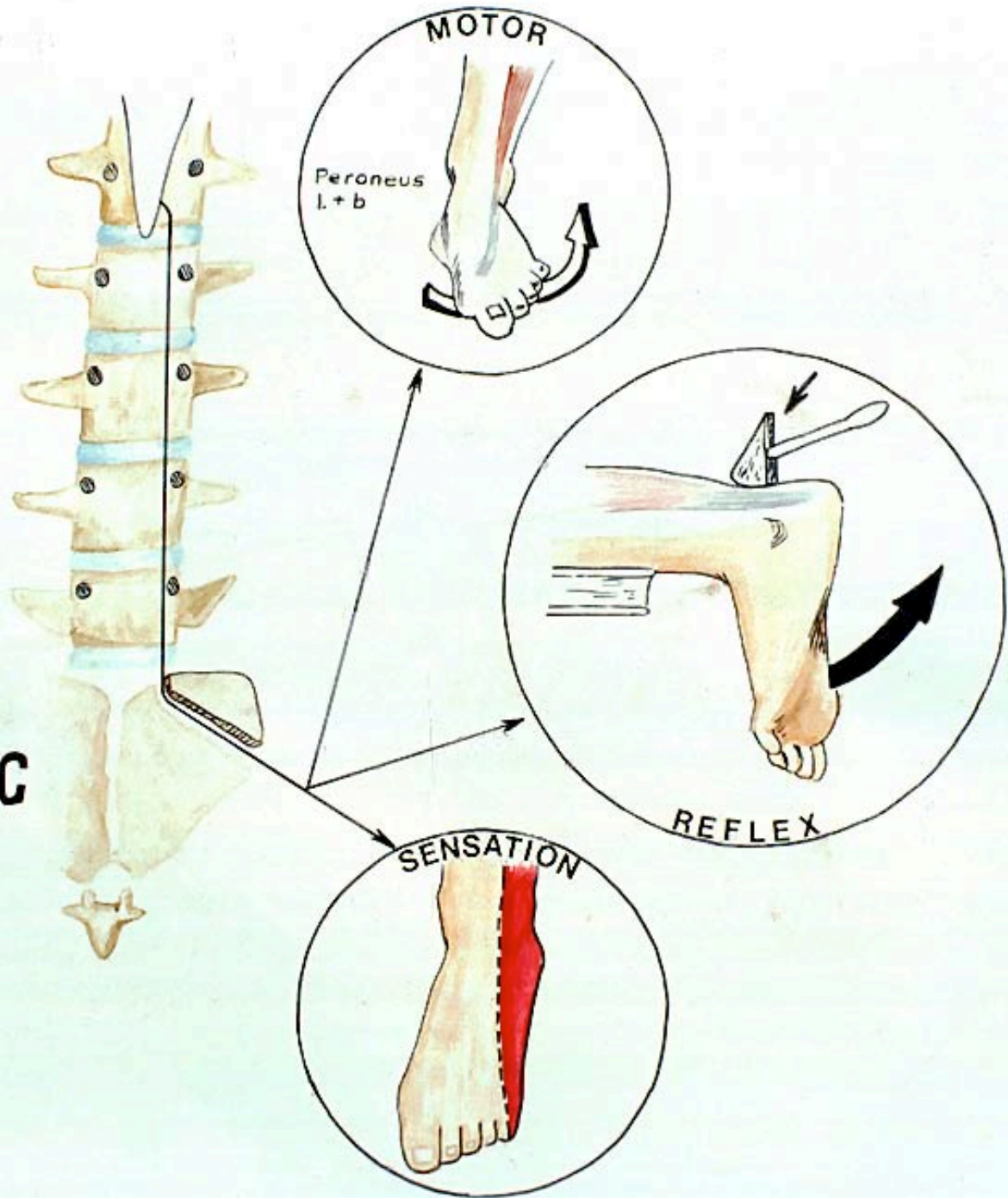


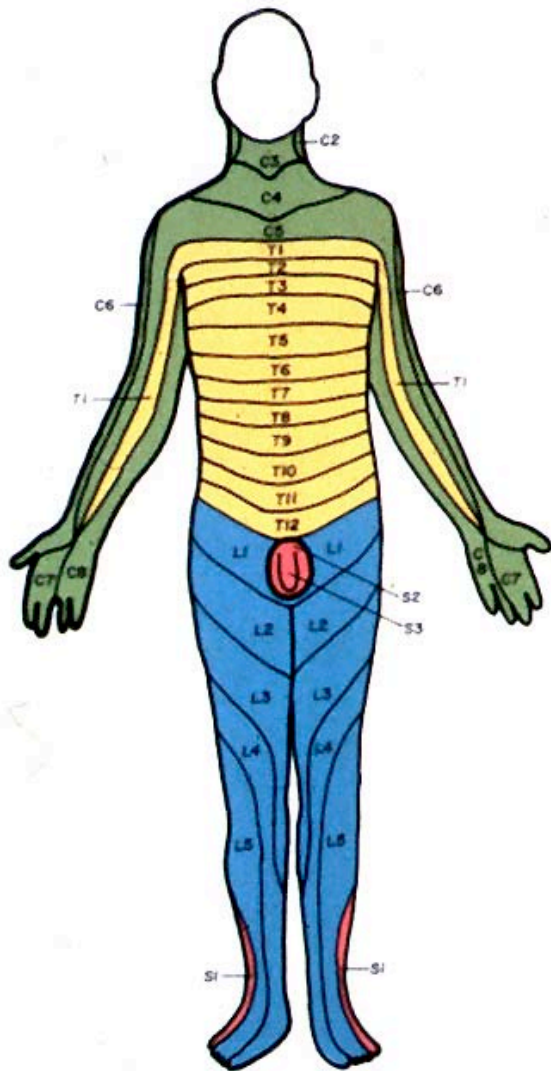
L4
NEUROLOGIC
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L5
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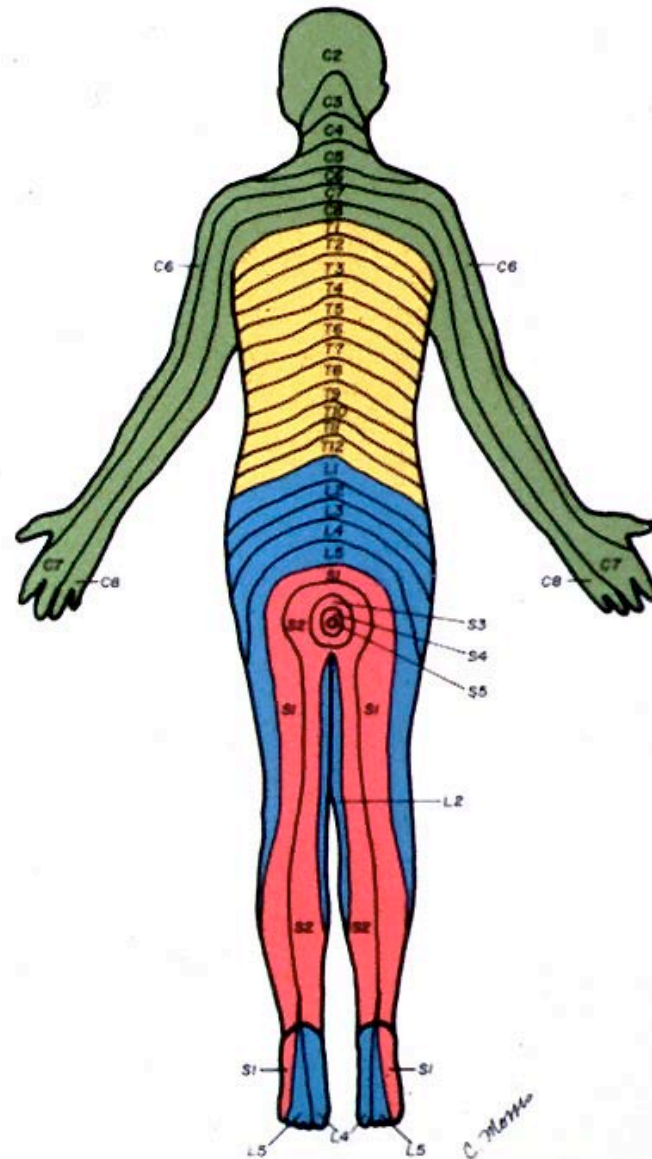


S1
NEUROLOGIC
LEVEL





ANTERIOR VIEW



POSTERIOR VIEW

Figure 4. The Dermatomes. Pain referred to the skin from a visceral organ tends to be 'felt' in a relatively small, circumscribed area, within the compass of the dermatome of the same spinal segment that supplies the viscus. (Carpenter, 1972).

Illustrated by Cindy Morris.

Rapid Sidelines Evaluation for the Brachial Plexus

- C5- Blocker
- C6- Beggar
- C7- Kisser
- C8- Gripper
- T1- Mr. Spock

Spinal Cord Injury

Physical Education Objectives for Students with Spinal Cord Injury:

- ~Respiratory Maintenance
- ~Self-assistance, independence, confidence through early successful experiences
- ~Strength and Endurance
- ~Range of motion, contracture prevention and treatment
- ~Weight Control
- ~Acquisition of healthy body image through specifically designed experiences
- ~Socio-emotional improvement
- ~Interpretive development

Spinal Myelodysplasias

(incorrect growth and formation of spinal cord, it's coverings, and related surrounding structures)

- Spinal myelodysplasias are neural tube defects (happened in womb)
- They are preventable by both men and women ensuring that they get the daily requirements of folic acid
- Three common types: meningocele, myelomeningocele, spina bifida occulta

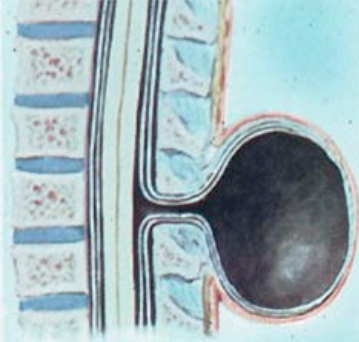
Spinal Myelodysplasias:

~Spina Bifida Occulta: the vertebral arch does not fuse together into one spinous process. (It is benign and hidden, most people who have it do not know they do- can be discovered through x-ray)

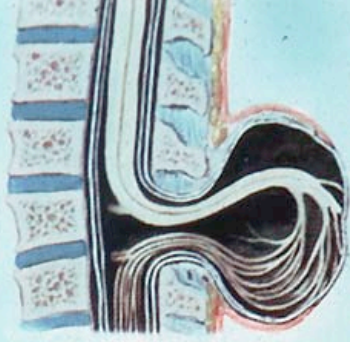
~Meninges: any of the three membranes that envelop the brain and spinal cord

~Meningocele: protrusion of the meninges into an external sac (or "cele")

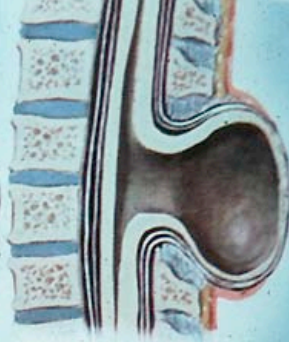
~Myelomeningocele: Protrusion of the spinal cord and its meninges into an external sac (or "cele")



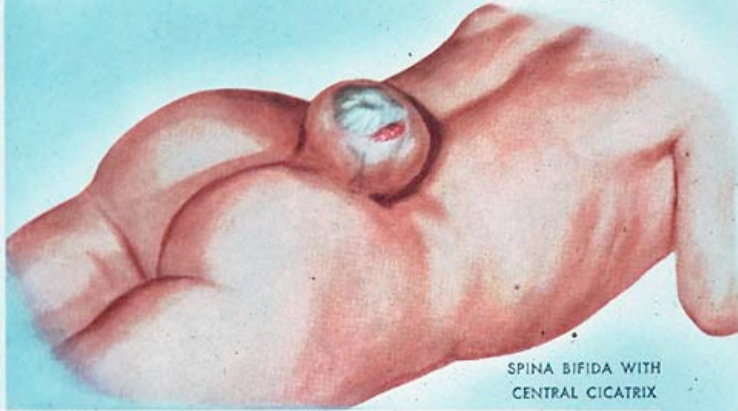
MENINGOCELE



MENINGO-MYELOCELE



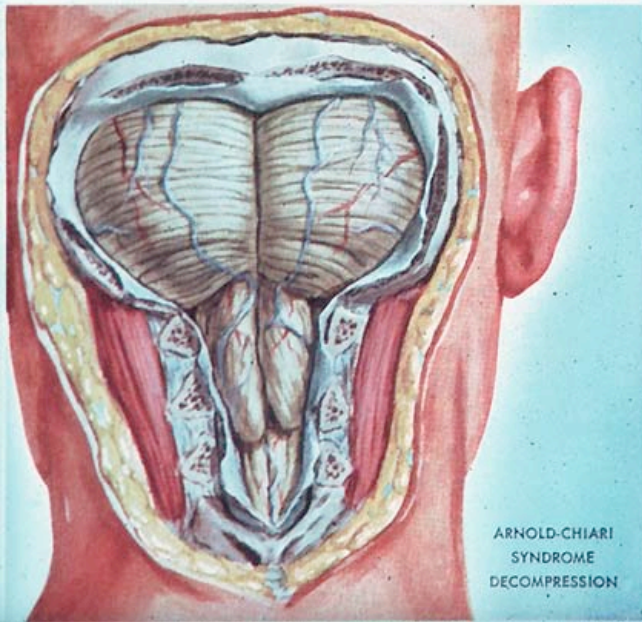
SYRINGO-MYELOCELE



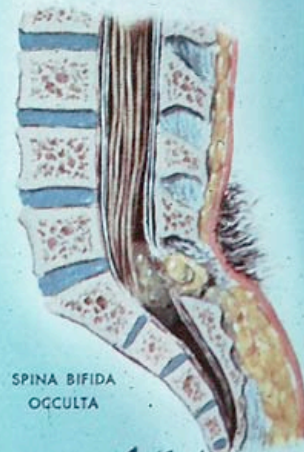
SPINA BIFIDA WITH CENTRAL CICATRIX



MYELOCELE



ARNOLD-CHIARI SYNDROME DECOMPRESSION



SPINA BIFIDA OCCULTA

F. Netter M.D.
Ciba

Spinal Myelodysplasias: Myelomeningocele

- Physical Education objectives for Students with a myelomeningocele:
- ~Perceptual Motor Therapy
- ~Develop upper body strength, balance, coordination, and endurance
- ~Develop fundamental motor and recreational skill appropriate to the level of the disability
- ~Develop body awareness
- ~Develop a sense of belonging and acceptance
- ~Develop a positive self image

Muscular Dystrophy

- Muscular dystrophy is a hereditary disease, marked by progressive weakness and wasting of skeletal muscle.
- No neurological involvement
- Signs and symptoms seen in early childhood
- Currently no cure- victims usually don't survive past 2nd decade of life

Muscular Dystrophy: Diagnosis

- Pseudohypertrophy (false growth): this is a condition where muscle protein is replaced by water, connective tissue, and fat
- Atrophy: wasting away of muscle tissue
- Clumsiness/Weakness: as muscular strength/control lost
- Gower's sign: Use of arms to push oneself erect by walking hands toward feet and up the legs and thighs to achieve a standing position
- Biochemically- Creatine Phosphokinase (CPK): CPK is usually confined almost exclusively to muscle, in MD as muscle cell membranes weaken and become more permeable substances normally in muscle can leak out. If CPK levels in blood are between 25-30 X's normal levels, it can be an indicator of MD

Gower's Sign

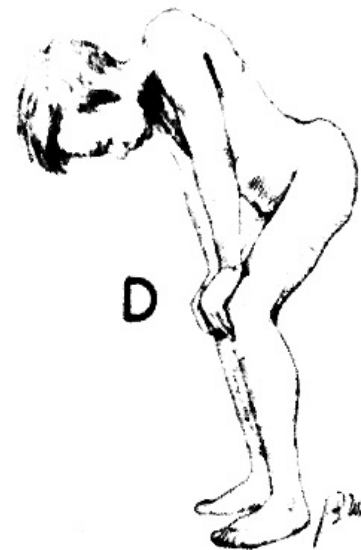
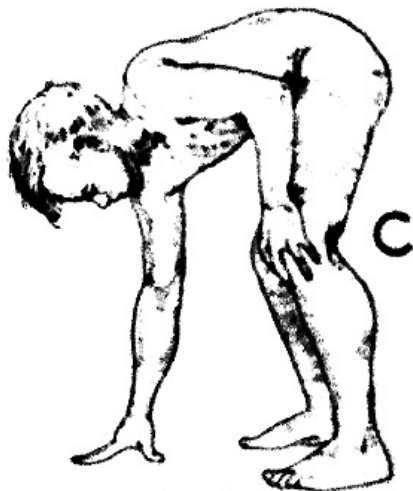
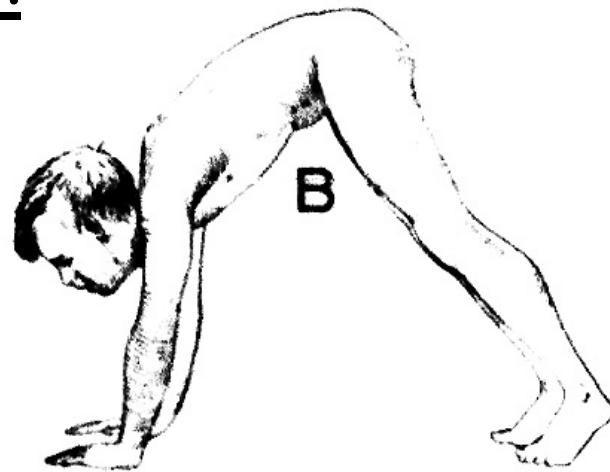
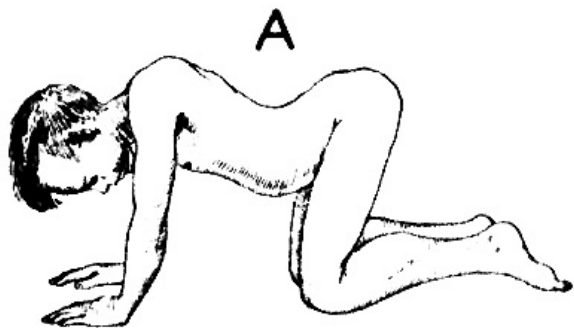


Fig. 4-50. Progressive muscular dystrophy. Characteristic method of rising to a standing position, the arms being used to push the body erect (Gowers' sign). Note the increased lumbar lordosis, relaxed shoulder girdle, and enlarged calves. (From Shands, A.R., Jr., et al.: *Handbook of Orthopaedic Surgery*. St. Louis, C.V. Mosby Co., 1963.)

Muscular Dystrophy: Physical Education Objectives

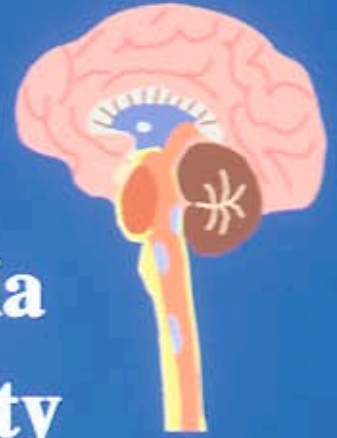
- Respiratory Maintenance
- Weight Control
- Joint positioning and maintenance
- General fitness/strength, endurance, range of motion, coordination
- Socio-emotional maintenance and development
- Interpretive Development

Cerebral Palsy

- Cerebral palsy is a disorder of movement and coordination resulting from brain damage.
- It is non-progressive and may occur from pre, peri, or post natal causes (around time of birth).
- Most common forms:
- spasticity (hypertonic stiff muscles),
athetosis (writhing, purposeless movement)
ataxia (Stopka's "drunk walk")

Causes of Cerebral Palsy may include:

- **Maternal infection, eg., rubella**
- **Maternal abuse of drugs or alcohol**
- **Maternal anemia; preclampsia, toxemia**
- **Maternal/fetal Rh factor incompatibility**
- **Brain damage during gestation or birth**
- **Infantile encephalitis or meningitis**
- **Infantile infections causing high fever**
- **Infantile trauma, hypoxia, anoxia, seizures, etc.**



INCIDENCE BY CLINICAL TYPES

Spastics	50%
Dyskinesia	30%
a. Athetoid	25%
b. Rigid	4.5%
c. Tremor	0.5%
Ataxia	5%
Mixed	15%

CLASSIFICATION BY REGION

Paraplegia

legs only

Tetraplegia

all four extremities
if spastic legs > arms
if athetoid arm > legs

Hemiplegia

one side of body

Triplegia

both legs and 1 arm

Double hemiplegia

spastic: arms > legs

Monoplegia

rare—more likely a leg

DEGREE OF INVOLVEMENT

MILD: ambulatory and ADL independent
needs no specific treatment

MODERATE: 50% ambulate with difficulty
speech and ADL problems
needs orthopedic care

SEVERE: fully incompasitated orthopedic
therapy of no value

CP: Physical Education Objectives

- Individualized program to improve General fitness/ strength, endurance, range of motion, coordination, locomotion, and balance
- Visual motor control and voluntary neuromuscular efficiency
- Extinction of inappropriate patterns of movement
- Introduction/development of relaxation techniques
- Specific attention to indicated occupational therapy areas of need (ex. Reach, grasp, carry, etc.)
- Socio-emotional maintenance and development
- Interpretive Development

Spinal Curvatures and Conditions

- Spondylolysis: A condition where a portion of a vertebra disintegrates if unchecked could result in a fracture
- Spondylolisthesis: forward slippage of vertebrae at fracture site.
- Scoliosis: A lateral curvature, accompanied by vertebral rotation of the spinal column
- Kyphosis: Spinal column curvature which is convex to the back and concave to the front
- Lordosis: spinal column curvature that is concave to the back and convex to the front
- Scheuermann's disease: Kyphosis accompanied by lordosis of the spinal column caused by wedging of the vertebral bodies due to degeneration of the epiphysis (growth plates)

Amputations

~Amputations can be congenital or acquired.

~Stopka's tip: Latin terms are usually used to describe congenital amputations (ex. amelia) and acquired amputations are usually described using terms such as "above elbow amputation."

****Check out chart in book about amputations!!! (pg. 48-49)****

~Phocomelia: "Seal-like" congenital malformation in which the proximal portions of the extremities are poorly developed or absent. Thus, hands or feet are attached to the trunk directly or by means of a poorly formed bone.

~The drug Thalidomide, given to pregnant women to treat nausea, also inhibits formation of blood vessels and is responsible for many cases of phocomelia. Thalidomide is not approved for use by expectant mothers.

Amputations: Physical Education Objectives

- Adapt limb loss to former and new physical skills, including use of prosthetic adaptations for sports
- Total self acceptance
- Proper stump care
- Enhance joint range of motion, coordination, strength, endurance and balance of the affected and unaffected sides.

Hip Diseases

Legg-Calve-Perthes disease

The physicians for whom this disease was named:

- ◆ **Arthur Legg** **U.S. surgeon**
- ◆ **Jacques Calve** **French orthopedist**
- ◆ **Georg Perthes** **German surgeon**

Hip Diseases

Perthes disease

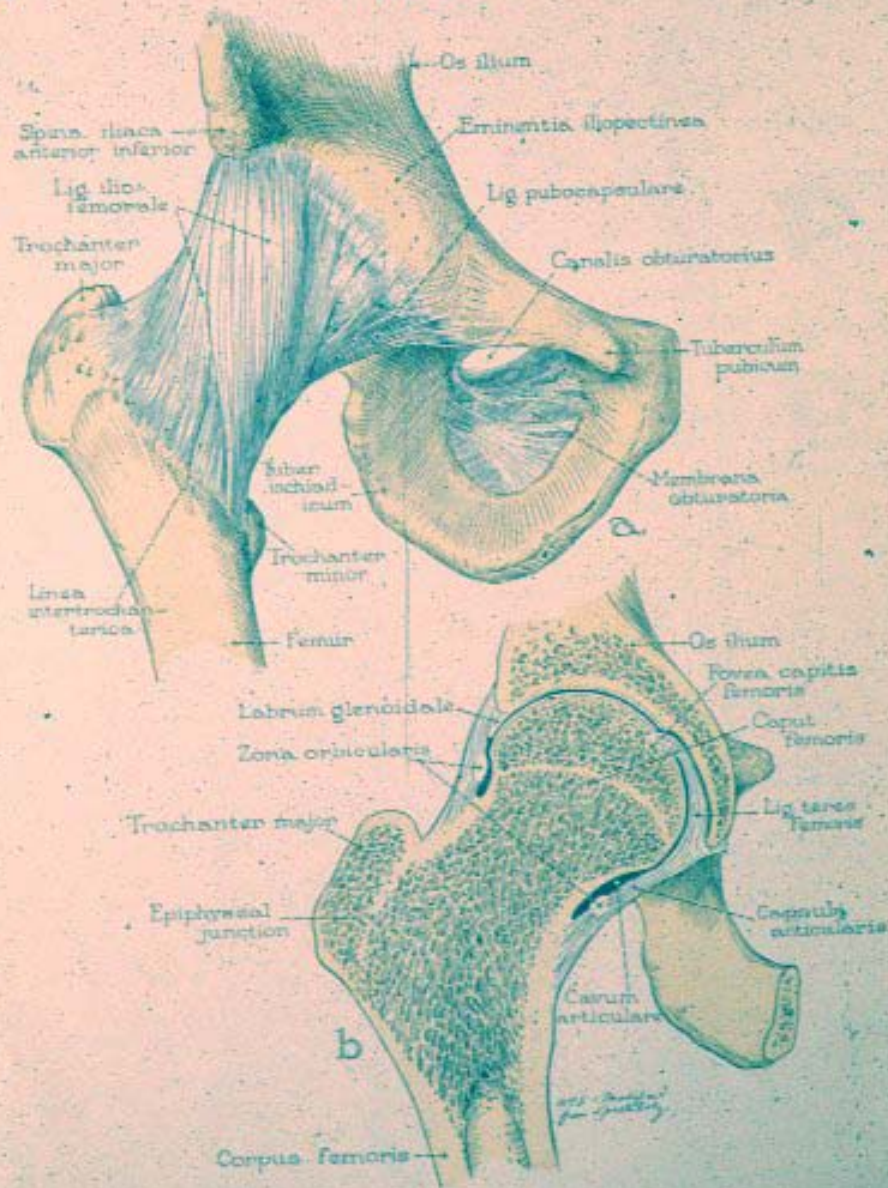
This disease involves degeneration of the femoral head. It is an osteochondritis of the upper femoral epiphysis. It involves avascular and aseptic necrosis. It occurs in children 3-12 years of age, usually boys; it is sometimes bilateral.



Hip Diseases

Slipped Capital Femoral Epiphysis

Slipped capital femoral epiphysis (SCFE) is a subluxation, or slippage, of the head of the femur at the physis (growth plate). The epiphysis gradually or suddenly slips downward and backward in relation to the neck of the femur. The cause is unknown however trauma, angle of epiphyseal plate, and hormonal abnormalities are important factors. SCFE affects individuals ages 8-18, usually males; it is usually bilateral.



Hip joint and obturator membrane. Entire and in coronal section; anterior views.

a. Ligaments of the articulation at the hip, and the membrane which, except for the space of the obturator canal, closes the obturator foramen in the innominate bone.

b. Articular cavity, capsule and supporting ligaments and cartilaginous lip of the hip joint.

The hip should always be examined in any adolescent or pre-adolescent who presents with knee pain without an obvious cause.



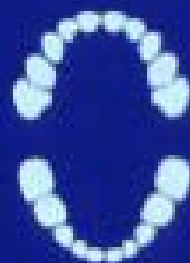
FIGURE 10.6 Slipped capital femoral epiphysis



Fig. 4-44. Mid bilateral sloped capital epiphysis. Fixation with threaded Krowles pins. A, Anteroposterior view. B, Lateral view, right hip. C, Lateral view, left hip. (From Tronzo, R.G.: *Surgery of the Hip Joint*. Philadelphia, Lea & Febiger, 1973.)

Osteogenesis Imperfecta

This is a genetic disorder of the connective tissue, mainly affecting the skeletal system. Also, affected areas include the teeth, sclerae of the eye, and potential for hearing loss. There is also a high incidence of respiratory infections, cardiopulmonary complications, scoliosis, and umbilical and inguinal hernias. The prognosis for normal life expectancy depends upon the severity of the disability. Cardiopulmonary problems are the usual causes of death.



Arthritis:

- Juvenile Rheumatoid Arthritis: Immune system attacks synovial membrane (synovial fluid used as a lubricant in joints to reduce friction between bones). The synovial fluid becomes "jelled" with debris and joints are painful. They are most painful when waking up after bed rest and minimal movement throughout night because the synovial fluid is most jelled. This jelling of the synovial fluid results in restricted range of motion and contractures. Exercise is great to get the fluid moving and reduce jelling, but morning is the worst time (too painful).
- Osteoarthritis: caused by wear and tear on the joints from overuse or injury, therefore exercising early in the day is preferable to night when the joints have endured many hours of gravitational stresses.

Juvenile Rheumatoid Arthritis: Physical Education Objectives

- Maintenance of range of motion to increase joint mobility and decrease possibility of contractures.
- Maintain muscular strength to compensate for muscle atrophy due to contractures and bed rest.
- Maintain cardio respiratory fitness
- Develop skills to permit individual and group participation in sport and game activities

Arthrogryposis

Arthrogryposis, or curved joint disease, is a generalized fixation, or ankylosis, of a joint that is present at birth.



Cystic Fibrosis

Cystic fibrosis is a hereditary disease of children involving defective production of enzymes in the pancreas with disturbances throughout the body, especially with pulmonary involvement.

It is a disease of the exocrine glands (glands that excrete mucus, saliva, sweat). When mucus blocks the pancreatic duct, enzymes needed for digestion cannot reach the small intestine which results in poorly digested food, foul smelling, bulky stools, and most importantly, malnutrition.



PEDIATRIC PULMONARY CENTER

Cystic Fibrosis

PHYSICAL EDUCATION OBJECTIVES FOR STUDENTS WITH CYSTIC FIBROSIS

1. RESPIRATORY MAINTENANCE AND CARDIORESPIRATORY IMPROVEMENT THROUGH PHYSICAL ACTIVITY.
2. INCREASE IN GENERAL FITNESS AREAS OF STRENGTH AND ENDURANCE.
3. DEVELOPMENT OF A HEALTHY MENTAL ATTITUDE.
4. DEVELOPMENT OF INDEPENDENCE.

Asthma

Asthma is a disorder of the respiratory system characterized by dyspnea, wheezing, tightness in the chest and bronchospasm. Allergic asthma is provoked by pollen, dust, molds, animal emanations, etc.

Exercise induced asthma (EIA) is defined as occurring with 5-8 minutes of sustained exercise at maximum $\dot{V}O_2$. Also, cold, dry air can provoke an attack.

U.S. Athletes with Asthma in the 1996 Olympic Games

**They won as many medals as
their asthma-free teammates!**

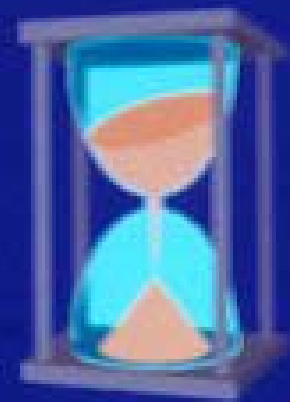


Of the 699 US athletes who completed a questionnaire, 117 had a history of asthma; 73 had active asthma, based on their need for medication. 16.7% of the athletes had asthma in 1996 compared to 11.2% in the 1984 Games (when these statistics were last recorded).

(University of Iowa study as reported by the PSM, Jan., 1999)

Diabetes Mellitus

Before diagnosis, common characteristics include frequent urination, excessive thirst, constant hunger, loss of weight, ketoacidosis, fatigue, vision changes and slow healing of cuts and bruises.



Diabetes Mellitus:

Chronic Degenerative Changes include:

- Diabetic Angiopathy: atherosclerosis of arteries and veins
- Diabetic Retinopathy: atherosclerosis of retinal artery
- Diabetic Neuropathy: nerve damaged due to ketoacidosis leading to inflammation
- Diabetic Nephropathy: shredding of glomerulus

Diabetes: Physical Education Objectives

- Develop healthy mental attitude
- Self discipline with respect to treatment regimen
- No adaptations are needed- except the teacher must be aware of each student with diabetes as well as the first aid required for a diabetic coma (insulin) and insulin shock (give sugar or fruit juice).

Diabetes: Effects of Exercise Training

- For all people: Increased insulin sensitivity, decreased body fat, increased cardiovascular function, decreased plasma triglycerides (if initially elevated), increased high-density lipoprotein cholesterol, psychological benefits
- For those with Type 1 Diabetes Mellitus: No probable improvement in glycemic control, possible decrease in insulin requirements
- For those with Type II Diabetes Mellitus: probable improvement in glycemic control, decrease medication dose due to improved insulin action and decreased body fat

Leukemia

Leukemia is essentially cancer of the white blood cells. It is characterized by over production of the immature forms of white blood cells leaving the skeletal and lymph systems clogged by these cells at the body's expense of the needed mature forms as well as the needed red blood cells.

Problems:

~Low red blood cell count: anemic

~Low platelets: trouble clotting, petechiae ("packed with bruises")

Leukemia:

Physical Education Objectives:

- ~Promote self-confidence and pride by engaging the child in successful experiences in physical education
- ~General fitness activities should be encouraged as the child can tolerate them
- ~Be in touch with the child's physician and other medical personnel in order to be advised on further indications