

The Late Effects of Polio and Your Health

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What is Wellness?

- More than the Absence of Illness
- An ongoing Process to Optimize Physical, Psychological and Spiritual Potential

Model

Clinical

Role performance

Adaptive

Eudaimonistic

Health

absence of signs & sxs

maximum expected

flexible to environment

exuberant well-being

Illness

presence of signs & sxs

total failure

failure in self-correction

languishing debility

Health & Homeostasis

$$\text{HEALTH} = f (O , P , E)$$

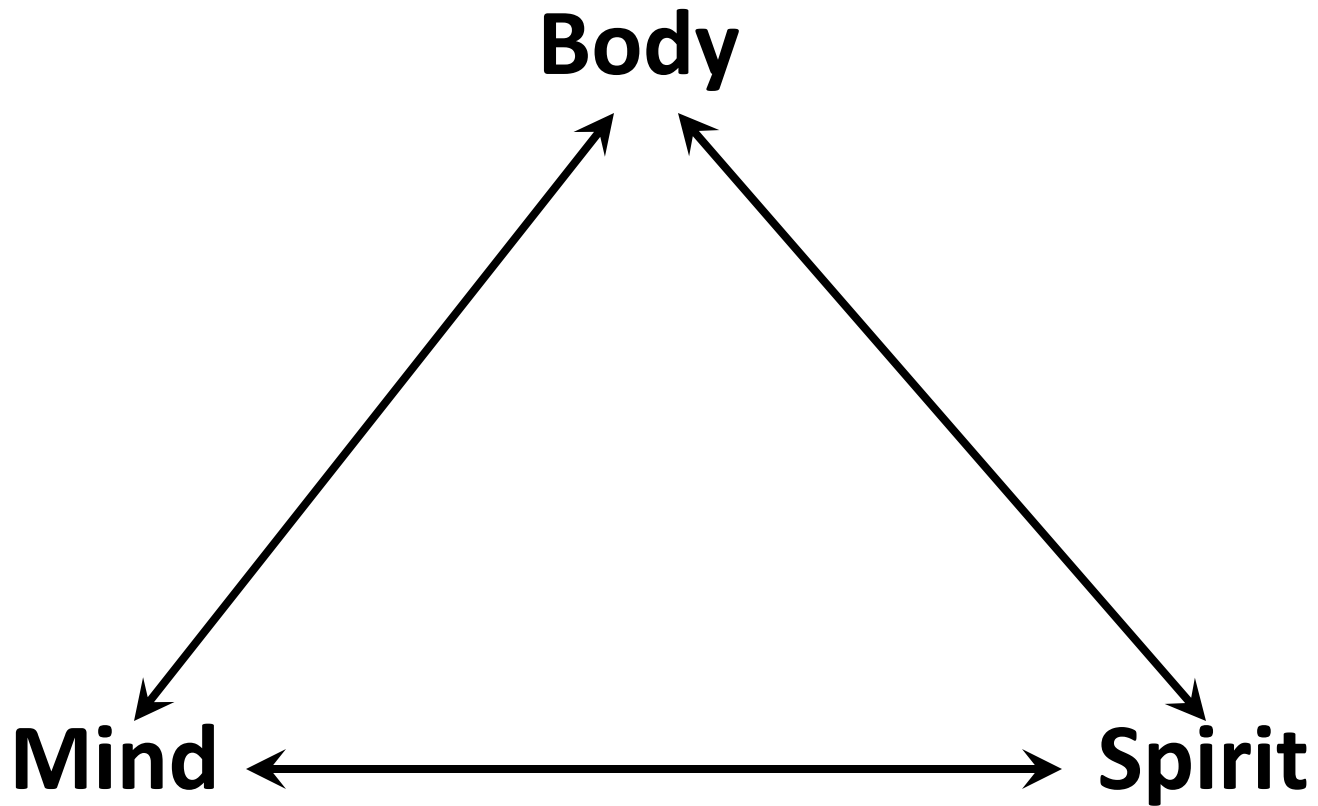
O = organic, physical

P = psychosocial

E = environmental

(Treischmann, 1980)

What is Holistic Health & Wellness?

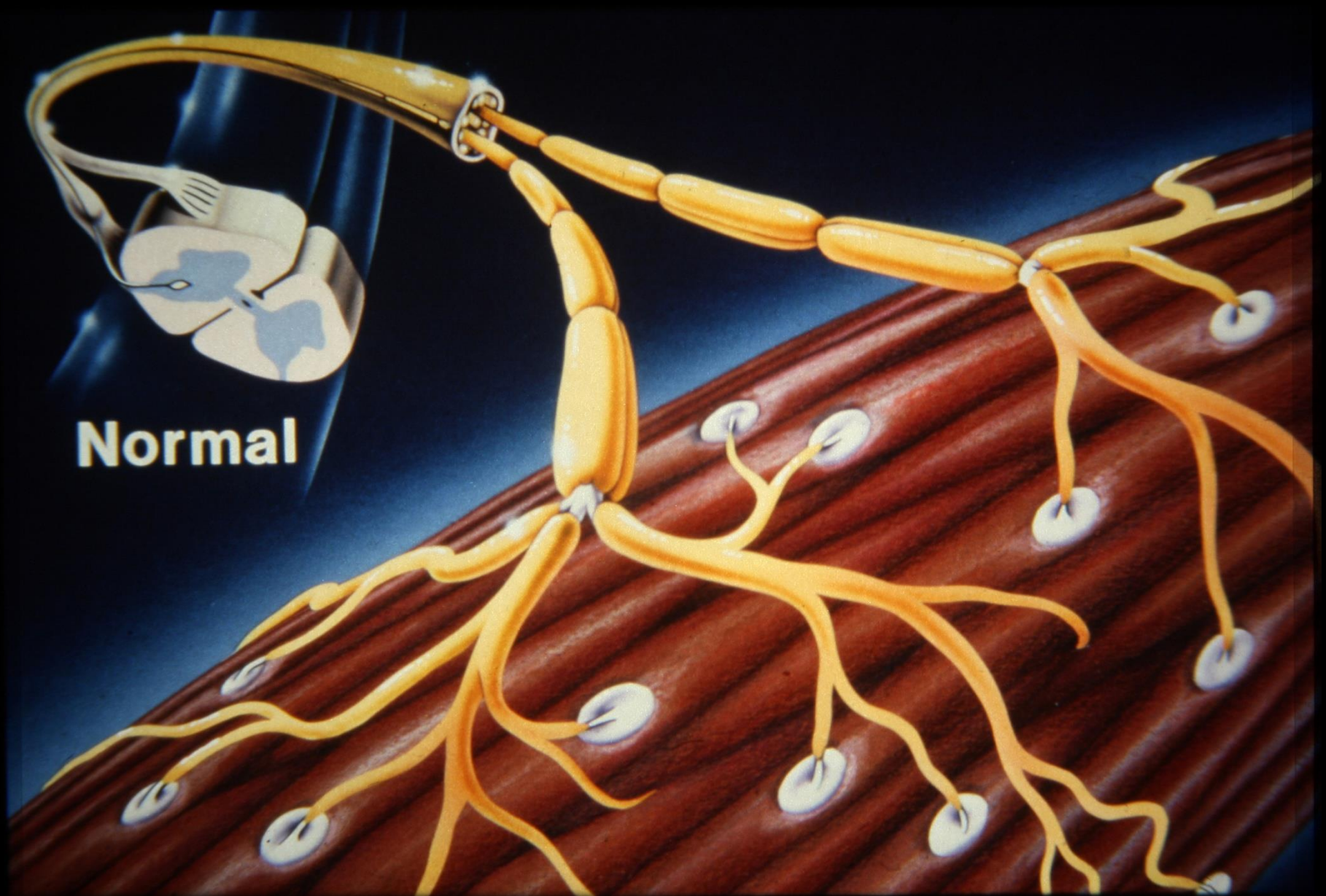


Health & Wellness Questions

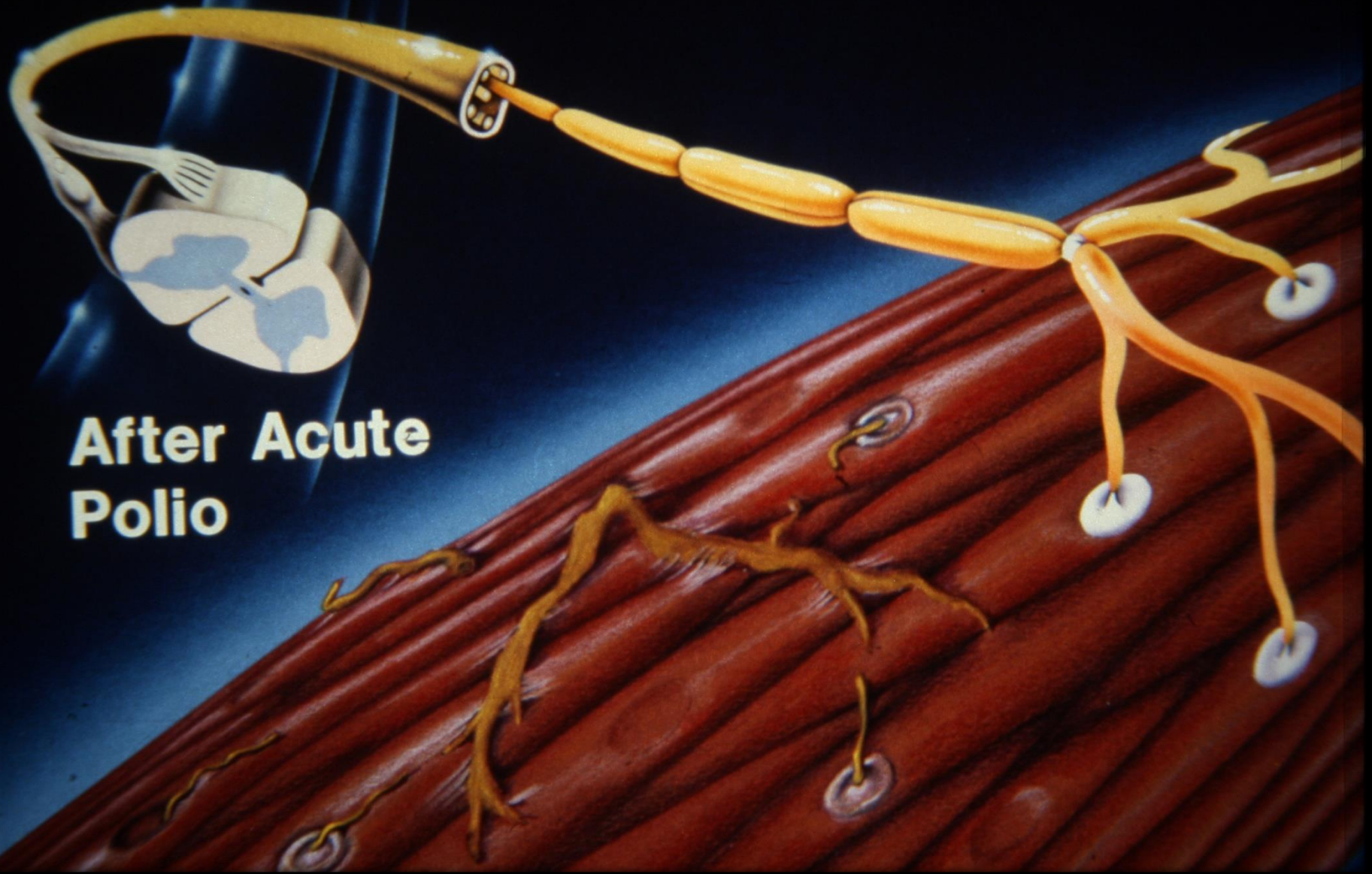
- Are they the same?
- How do Wellness & QOL relate?
- How do Wellness and Disability relate?
- How do the components and/or expectations of Wellness change with aging?

Categories of Change while Aging with Polio Sequelae that Affect Health & Function

1. Secondary complications of the polio itself
 - * Initial Sequelae: eg. atrophied short limb
 - * Late Sequelae : eg. PPS

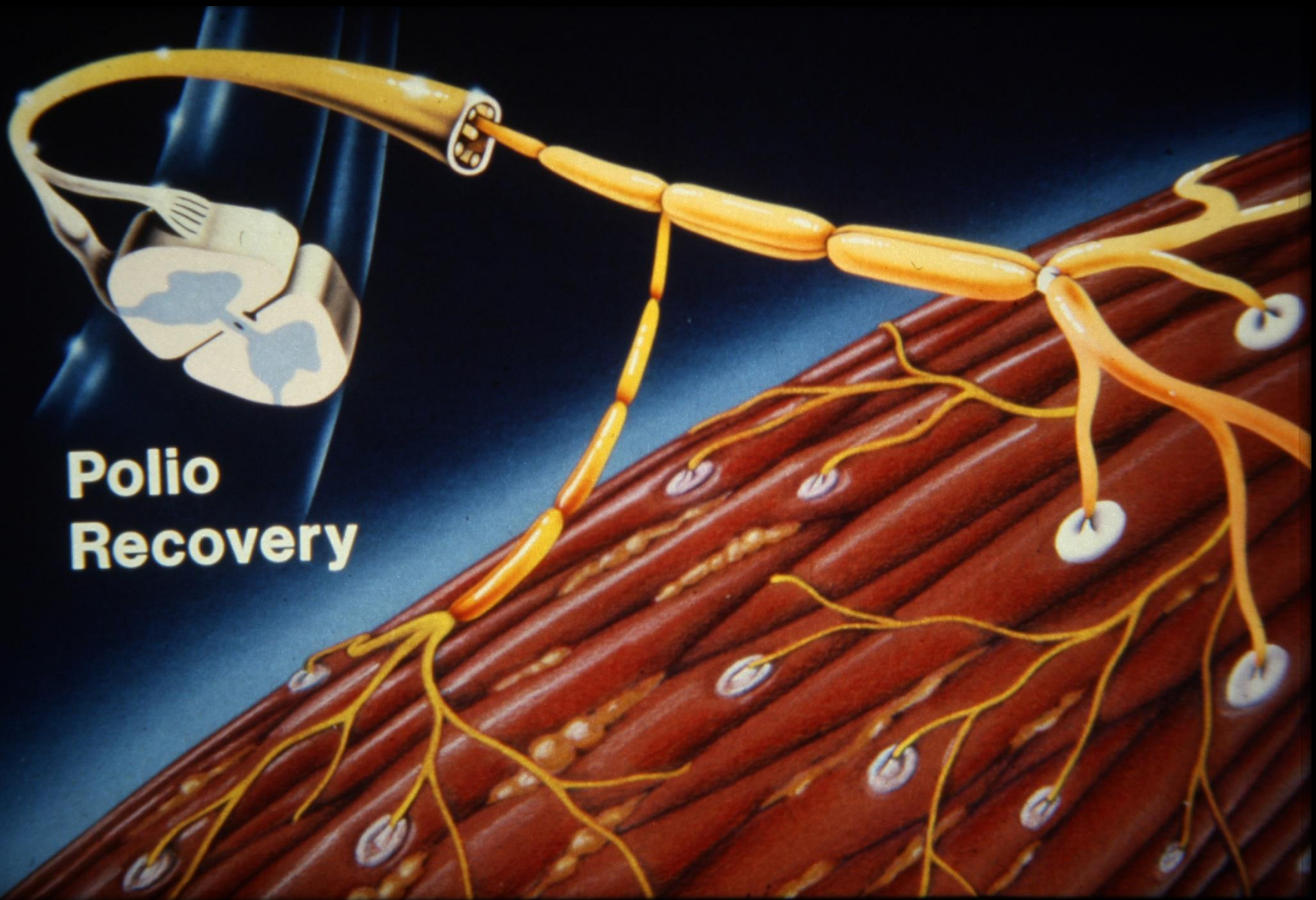


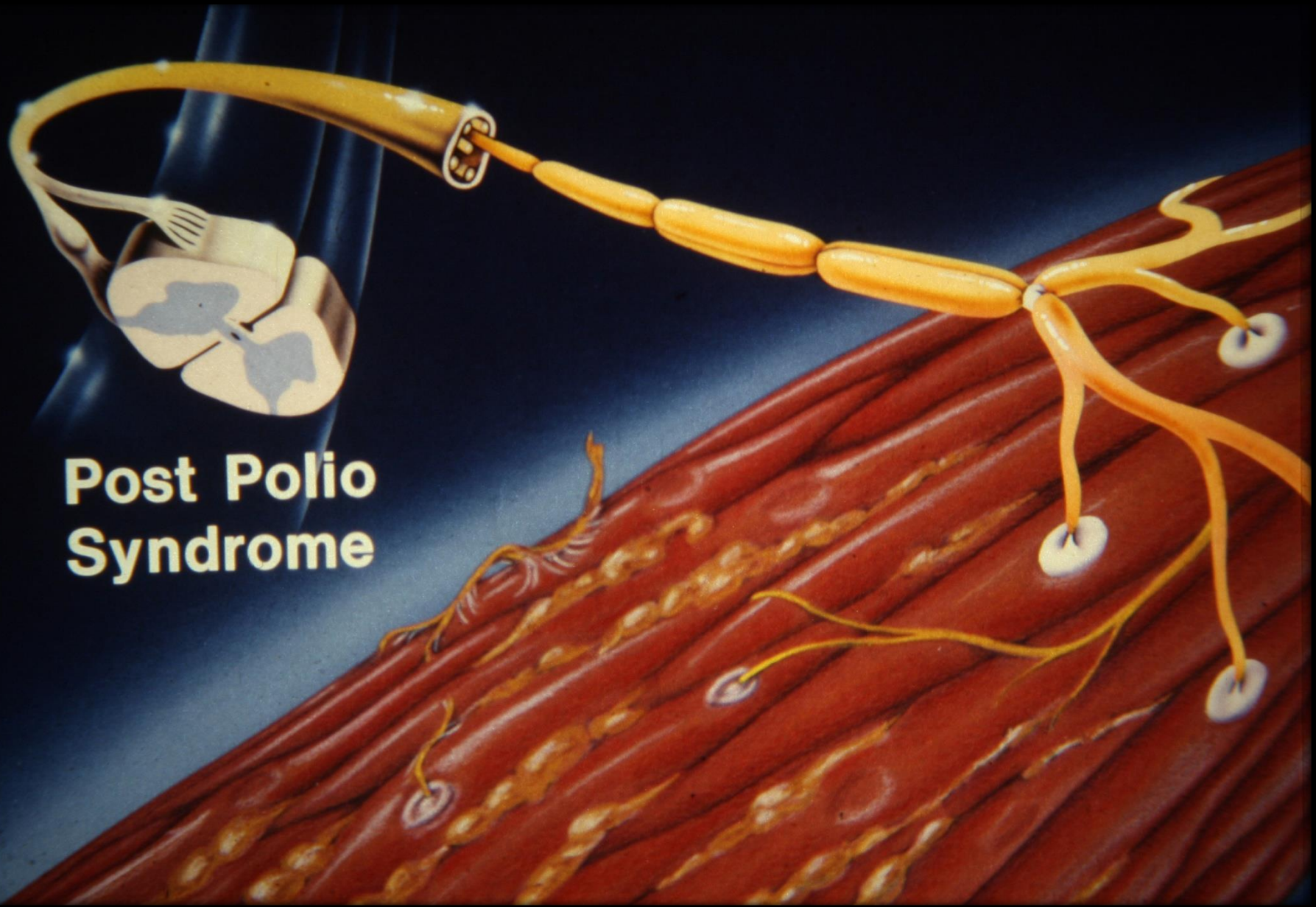
Normal



**After Acute
Polio**

Polio Recovery





**Post Polio
Syndrome**

Diagnostic Criteria for PPS

- 1) A prior episode of previous poliomyelitis with residual motor neuron loss, which can be confirmed through a typical patient history, neurologic exam and if needed electrodiagnostic testing.
- 2) A period of neurologic recovery followed by an interval (usually > 15 years or more) of neurologic and functional stability.
- 3) A gradual or abrupt onset of new weakness and/or abnormal muscle fatigability (decreased endurance) with or without generalized fatigue, muscle atrophy and/or pain.
- 4) Exclusion of medical, orthopedic, and/or neurologic conditions that may be causing the symptoms in 3).

Theories of Causation of PPS

- Immunologic
- Age-related loss of AHC's : ? Accelerated
- Overuse : ? Accelerated Wear & Tear
- Underuse : ? Accelerated Disuse Atrophy
- Toxin Exposure
- Stress
 - . environmental / social
 - . psychoemotional
 - . physical : disease , infection , trauma

Predictive Factors for PPS

Trojan (1994)

- Retrospective Review
- Post-polio Clinic Sample
- 353 eligible
- 187 (53 %) excluded due to past / concurrent medical conditions.
- 127 met criteria for PPS
- 39 met criteria for controls

Factors significantly associated with PPS

- greater age
- longer time since onset
- more weakness at acute polio
- recent weight gain
- muscle pain
- joint pain

Categories of Change while Aging with Polio Sequelae

1. Secondary complications of the polio itself
2. Secondary complications related to Living with Polio Sequelae : eg. shoulder pain, postural problems, back-knee, arthritis, etc.

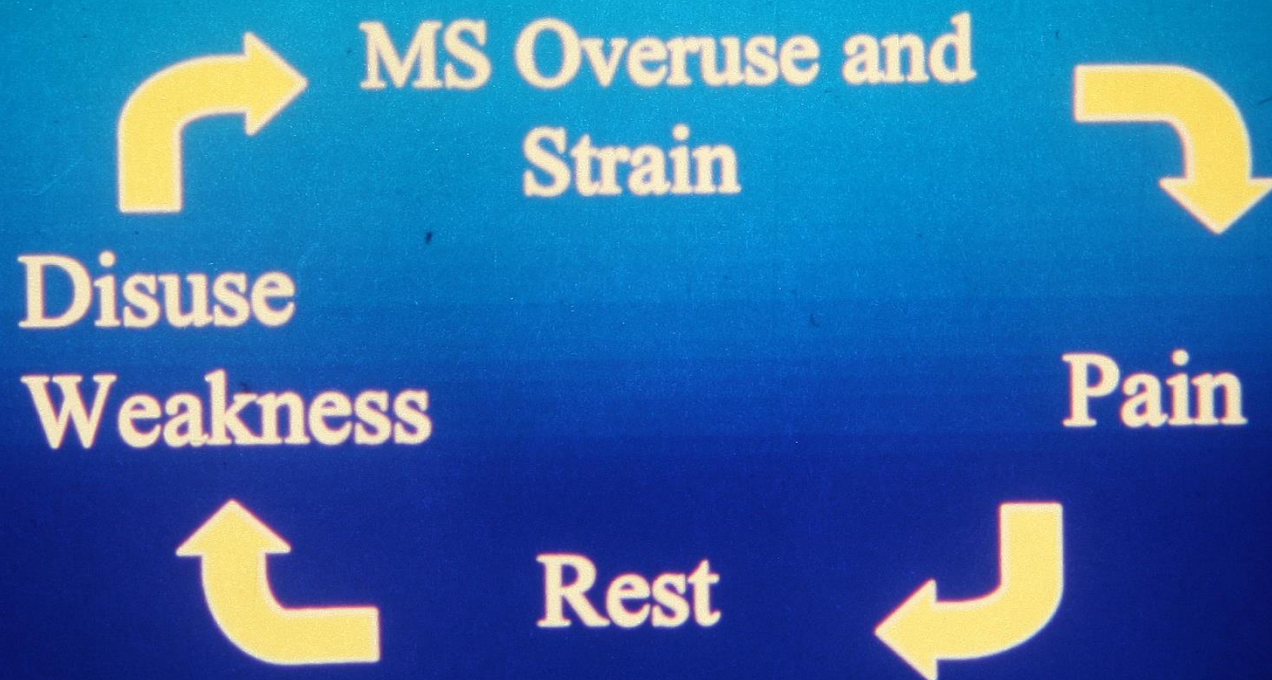
Expected Physiologic Changes From Aging

- Decreased number of nerve cells (brain & cord)
- Decline in Vital Capacity (VC)
- Decline in maximum heart rate & cardiac output
- Increase mean systolic blood pressure
- Decreased collagen elasticity -> less flexibility
- Decreased cartilage nutrition & size
- Decline in bone mineral mass
- Delayed carbohydrate metabolism
- Decline in immune system competence

Theories of Causation of PPS

- Immunologic
- Age-related loss of AHC's
- Overuse / Accelerated Wear & Tear
 - . neurologic
 - . musculotendinous
 - . joints

A Vicious Cycle



Categories of Change while Aging with Polio Sequelae

1. Secondary complications of the polio itself
2. Secondary complications related to Living with Polio Sequelae
3. Co-morbidities of aging : eg. heart disease, diabetes, cancer, obesity

Medical Co-morbidities* in 120 Post-Polio Subjects

Maynard et al (2002)

CONDITION	% of Subjects
Diabetes	3.5
Respiratory Distress	7.5
Heart Trouble	8
Circulatory Trouble - Legs	5
G I Disorder	8
Urinary Tract Disorder	4
Rheumatic Arthritis	3
Nerve / Muscle Disorder (eg.MS,CVA)	9
One or More	35

* Judged serious enough to affect functional capacity

Life-Long Morbidity among Danes with Polio

- 542 people w/polio (1919-1954) age & gender matched to controls
- Polios at increased risk of hospitalization for heart diseases, lung diseases, GI diseases, and diseases of locomotive apparatus
- Risk highest among those who contracted respiratory polio < age 5

(Nielson et al,2004)

Co-morbidity Profile of Polios in a Chinese population

- 2032 people w/ paralytic polio in a registry
- Prevalence of diseases compared to age, gender & socioeconomic matched controls
- Polios had higher prevalence of most chronic conditions – from heart disease to Parkinson's disease, stroke, COPD & rheumatoid arthritis
- Prevalence not higher for Lupus, TB, or drug & alcohol abuse (Kang, 2001)

Categories of Change while Aging with Polio Sequelae

1. Secondary complications of the polio itself
2. Secondary complications related to Living with Polio Sequelae
3. Co-morbidities of Aging
4. Psychosocial Changes, eg. acceptance of increased disability, depression, loss of job
5. Environmental Changes, eg. social, community, cultural

Key Strategies for Achieving Lifetime Wellness after Polio

1. Optimize Activity and Exercise

Promoting Exercise & Activity

- Many Benefits : CV Fitness, lipid profile, weight mx, neuro. recovery, immune system, improved sleep, bowel mobility, self-image, pain mx.
- National Ctr. on Physical Activity & Disability
- Specialized Equipment & Programs: eg. pools, bikes, dances, yoga, tai chi, etc.
- Home, Facility and Community-based Options
- Action Canada's Physical Activity Guidelines

Controversies about Exercise for Post Polios

- Is it GOOD or BAD?
- Type & intensity of exercise
- Methods of exercise
- Which muscles?
- What if you have PPS?

Definitions

Exercise - planned, structured, repetitive
bodily movement.

Physical Activity - movement occurring during
daily activities

Therapeutic Exercise - done for a specific
health purpose

“Common Sense” FACTS

- Inactivity rapidly leads to weakness and deconditioning
- Over-exertion can lead to injury, pain and overuse weakness

Type and Intensity of Exercise

- Flexibility exercises
- Strengthening exercises
- Conditioning/endurance exercises

Exercise and PPS

- No universal definition of PPS
- Diagnosis of exclusion
- Exercise approach same but more careful and limited (begin 30% max)
- Activity/Exercise habits before new weakness noted must be honestly described
- Stress, General Health and Lifestyle are critical issues

Factors Leading to Perception of Loss of Strength

- Unawareness of strength loss from acute polio
- Aging process
- Weight gain
- Poor nutritional habits
- Underactivity; deconditioning
- Overactivity; over use
- Poor pacing skills

PHI's Task Force Recommendation on Exercise

- Individualized Exercise Program (IEP) can enhance health and functional activity tolerance of polio survivors
- Professionals with knowledge of PPS & exercise should design and supervise IEPs
- Two month minimum needed before transition to self-directed program
- Follow general principles of low/moderate intensity, slow progression and pacing
- Consider rotation of exercise type:
 - Less frequent bouts
 - Longer duration of time (weeks/months) to achieve goals

Which Muscles to Target?

- Those with therapeutic goal
- 5 Point Classification System (Halstead)
 - I - no clinical polio (no sxs, NI EMG)
 - II - sub-clinical polio (no sxs, benign EMG)
 - III - clinically stable (no sxs, EMG+, chronic weakness)
 - IV - clinically unstable (new weakness, EMG+)
 - V - severely atrophic polio

Pain and Exercise

- Muscle Pain vs. Joint Pain
- Muscle pain occurring with daily activity may require some modestly painful strengthening exercise to resolve
- Vicious cycle of:



- Fear avoidant attitude toward pain & activity is major problem in US population

Acute and Chronic Stress & Strain Syndrome

- Muscle
- Tendon
- Myofascial
- Joint
- Ligament
- Spine and discs
- Peripheral nerves
- Whole body – Stress disorders

Nothing Ventured/Nothing Gained

- Honest & timely communication with professionals involved with training
- Use of Adaptive Equipment
 - Start exploring uses before you have to
 - May solve one problem but create others
 - Goals are essential

Exercise Studies - Conclusions

- Some muscles can improve strength and/or endurance
- Some post-polios can improve fitness
- Interval training and pacing are essential to success
- Goals for exercise should be clear

Key Strategies for Achieving Lifetime Wellness after Polio

1. Optimize Activity and Exercise
2. Optimize Nutrition, Sleep and Stress

Promoting Optimal Nutrition

in Polio Survivors

- Monitor body weight, lipids, BS
- Fluids and fiber for colonic health
- Swallowing difficulties
- Food composition and quantity
- Medication effects
- Alcohol & substance abuse
- Vitamin & Mineral Intake & Levels : Vit. D. Ca++, Vit.B-12, Zn, Vit.C

Promoting Optimal Sleep

- Sleep Habits : time, environment, immediately preceding activity
- Pain Control : bed, positioning, meds
- Sleep Apnea & Nocturnal Hypoventilation
- Sleep Aids : non-meds and meds

Stress Management

- Education & Training in Techniques : eg. Yoga, TM, mindfulness training, massage
- Readings, Seminars, Workshops
- Professional Counseling
- Meds for anxiety a last resort

Key Strategies for Achieving Lifetime Wellness after Polio

1. Optimize Activity and Exercise
2. Optimize Nutrition, Sleep and Stress
3. Prevent Complications and/or Recognize and Treat Them Early

Polio & Aging

Obesity

- Compromises mobility & leads to overuse
 - Common with age-related changes in metabolism & activity patterns
- Predisposes to Type-2 diabetes & arthritis

SCI & Aging-?Polios

Risks of Diabetes & CAD

- Among 45 Paraplegics aged 49 & 16 YPI
 - 29% had impaired Glucose Tolerance
 - 20% met criteria for Diabetes mellitus
 - 48% had HDL's >35
 - 20% had LDL's < 130
 - 12/19 had abnl. Radionucleotide Imaging
 - 5/19 had silent MI's
- Duckworth, 1980
 - 56% of 41 SCI's diabetic by OGTT w/ nl FBS
- Brenes, 1986 and Dearwater, 1986
 - W/C Athletes have higher HDL levels

(Bauman, 1992)

Polio & Aging : GI system

- Bowel Evacuation Programs as aging further slows colonic transit times
- Rectal bleeding and hemorrhoids
- Schedule regular colonoscopies for cancer screening
- Decreased stomach acid predisposing to Vit. B12 deficiency
- Swallowing & esophageal problems

Polio & Aging

Neurological Problems

- Post- Polio Syndrome (new/greater weakness) may develop in up to 50%
- Can present as long as 50 YPI
- Symptoms vary
- Progression is unpredictable
- Treatment strategies can help slow progression & maintain function

Polio & Aging

Carpal Tunnel Syndrome

- Prevalence estimates of 16-46 %
- Can be asymptomatic
- Greater in paraplegics, W/C pushers & crutch/cane users
- EMG needed if surgery contemplated
- Night splints, therapy & injections can be helpful

Polio & Aging

Musculoskeletal Problems

- Osteoporosis inevitable with no-weight bearing and/or sig. limb weakness
- Appropriate goal is to minimize osteopenia
- Vit. D and Ca⁺ intake important
- Extremity fracture rates high but healing OK
- Shoulder pain common in most w/ LL's weak
- Hand pain common & many causes
- Overuse arthritis hips, knees & back common

Polio & Aging

Immune System

- No longitudinal research data on polios
- Immune function tends to decline w/ aging
- Immune system depressed by :
 - chronic stress
 - depression
 - losses of social support
 - chronic pain
 - polypharmacy

Aging & Polio

Breathing Issues

- Age-related declines + polio-related chest wall and/or diaphragm weakness can lead to change from mild to severe resp. impairment
- Yearly monitoring of Vital capacity if bulbar Hx
- Many options for part-time ventilator support
 - Sleep Apneas— Treat with C-PAP
 - Nocturnal Hypoventilation—Treat w/ Bi-PAP

Key Strategies for Achieving Lifetime Wellness after Polio

1. Optimize Activity and Exercise
2. Optimize Nutrition, Sleep and Stress
3. Prevent Complications
4. Educate Yourself, Family and Friends
 - *printed, video, computer
 - *formal programs & conferences
 - *individualized methods & assessments of learning

Key Strategies for Achieving Lifetime Wellness after Polio

1. Optimize Activity and Exercise
2. Optimize Nutrition, Sleep and Stress
3. Prevent Complications
4. Educate Yourself, Family and Friends
5. Personal Empowerment
 - * Take Control, whenever possible
 - * Peer Support and Interaction
 - * Education and Training

The Health-Promoting Lifestyle

Key Dimensions

- Self-actualization
- Health Responsibility
- Exercise
- Nutrition
- Interpersonal Support
- Stress Management

(Walker, 1986)

Living a Healthy Life with Chronic Conditions

Self-Management of Heart Disease,
Arthritis, Diabetes, Asthma,
Bronchitis, Emphysema and others

Kate Lorig, RN, DrPH, Halsted Holman, MD
David Sobel, MD, Diana Laurent, MPH
Virginia González, MPH, & Marian Minor, RPT, PhD



Key Content Areas for Health & Wellness Programs

- BODY -- MIND -- SPIRIT
- EXERCISE -- NUTRITION -- LIFESTYLE

Camp Dream
Post-Polio Wellness Retreat
April 19-23, 2009



Roosevelt Warm Springs Institute for Rehabilitation





BAY CLIFF
HEALTH CAMP















Lifetime Wellness with Post-Polio Residuals

Conclusions

- No disabilities are truly 'Static'--- everyone ages and change is INEVITABLE
- Wellness may look different at different life-course stages
- Impacts of PPS can be managed
- Impacts of aging may be different for Polios—probably earlier & greater impacts on function
- Patient/Professional partnerships essential