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**THE LATE EFFECTS OF POLIOMYELITIS:  
A RESOURCE GUIDE FOR SURVIVORS**

**Philip G. Ruiz**

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# THE LATE EFFECTS OF POLIOMYELITIS: A RESOURCE GUIDE FOR SURVIVORS

Philip G. Ruiz

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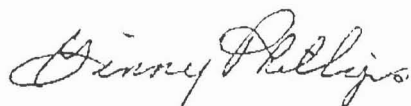
## FOREWORD

The Polio Support Group of Nova Scotia was formed in 1990. We now have a registry of more than 400 and the number continues to grow. The Support Group is dedicated to providing support and information on the late effects of polio to survivors, their families, and health professionals.

The primary objective of this booklet is to compile information and resources for polio survivors. This will help us to understand the late effects of polio. This understanding can assist us to develop new life skills and to access the necessary resources to effectively cope with living and adapting to the changes we face. With knowledge comes understanding, with understanding comes hope. This information is about self-help.

This booklet has been made possible by a community health grant awarded to our group. I wish to acknowledge Dr. Joan M. Walker for supervising this work, and Faye Joudrey for writing the grant proposal and dispensing the funds. Most of all, I thank Philip Ruiz for the research and excellent presentation of this material. It has been my pleasure to work with him. I believe that many people will benefit from this project.

Sincerely,



Ginny Phillips, President,  
Polio Survivors Support  
Group of Nova Scotia

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## ACKNOWLEDGMENTS

Putting together this resource booklet has been an enjoyable and very educational experience and was only possible through the efforts of the following people:

The Nova Scotia Department of Health for supplying the necessary funds to the Abilities Foundation of Nova Scotia for the booklet.

Faye Joudrey, the Abilities Foundation's Community Liaison Officer, for applying for the grant, dispersing funds, and for her overall support throughout the booklet's creation.

Dr. Joan M. Walker, for her guidance and understanding when editing. Also, for instructing me in more appropriate and efficient writing techniques which I will use in future writing endeavors.

Thomas Michael Ruiz for the many creative diagrams throughout the booklet.

And, last but not least, thanks to the president of the polio support group in Halifax, Ginny Phillips, whose moral support and encouragement was often the driving force throughout the entire research and writing process.

Sincerely,



Philip G. Ruiz, BSc, 1994  
3rd Year Physiotherapy Student,  
Dalhousie University

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## INTRODUCTION

The epidemics of poliomyelitis in North America have long since passed, thanks to the development of the Salk and Sabin vaccines in the 1950's. For most people, including the polio survivors, polio is a disease of the past. However, effects of the disease are still very evident in today's society. As survivors age, they are reporting numerous new physical problems. Along with the physical problems, many fears and questions are arising. The purpose of this resource booklet is to address many of these fears and questions and to suggest to polio survivors means and resources which, if used, will enable them to better adapt and cope with their daily lives.

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### Terms used to describe the LATE EFFECTS OF POLIOMYELITIS

*late onset*

*post polio syndrome*

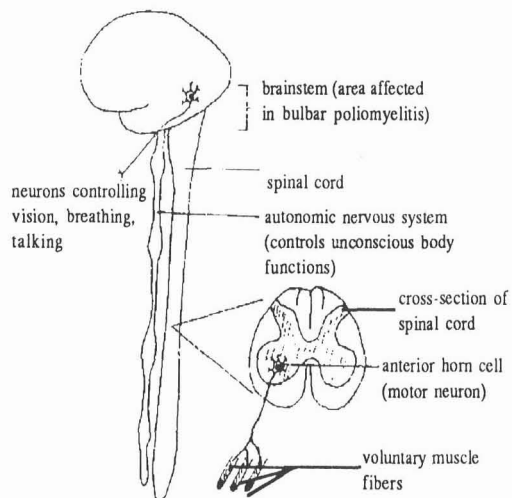
*progressive muscular atrophy*

*post polio muscular weakness*

*post polio sequelae*

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Before addressing the late effects of poliomyelitis it is important to understand what changes occurred during the acute attack of the polio virus. There are three different serotypes or strains of the polio virus, and *this virus is capable of affecting most neurons of the central nervous system and not just motor neurons.*<sup>1</sup> ✓ This explains the differences in clinical symptoms shown by persons affected and why different polio epidemics arose around the world. For instance, the virus could affect neurons in the brainstem which control breathing, causing respiratory difficulties, due to paralysis of



there is a relationship with the time period since the acute attack.<sup>6</sup> The late effects of polio are commonly reported around 30 years after the acute attack.<sup>7</sup> Age related changes occurring naturally in the anterior horn cells of the spinal cord, the motor units, and within muscles themselves, begin around the age of 60.<sup>8</sup> The late effects of polio can not be entirely attributed to aging because many polio survivors showing symptoms are under the age of 60.

Muscles are made of two different types of fibers, Type 1 fibers and Type 2 fibers. Type 1 fibers are involved in activities which require endurance, while Type 2 fibers are used for fast movements and strength.

Often with aging, individuals show some loss of strength (weakness) and often decrease their physical activity. With this, older muscles show a change in fiber type with Type 1 fibers being more common; Type 2 fibers appear to be lost.<sup>9</sup> The loss of fibers is due to decrease in motor units and anterior horn cells.<sup>3,10</sup> If half of the anterior horn neurons in a polio survivor were destroyed during the acute stage of polio and more are lost with age, then it is obvious that a polio survivor will be much more severely affected by the effects of aging than an unaffected person of the same age. The Rule of Thirds is used to explain how age affects polio survivors.

*Rule of Thirds* —> *Age Changes = Disease + Disuse + Normal Aging*

So what is Post Polio Sequelae? Post Polio Sequelae (PPS) is a very elusive concept. PPS can be defined as

*the onset of two or more of the following new health problems, unexplained fatigue, muscle or joint pain, muscle weakness, muscle atrophy, functional loss, and cold intolerance after a period of at least 15 years of neurological and functional stability with no other explanation for these problems* (Halstead and Rossi, 1985).<sup>11</sup>

There are two types of Post Polio Sequelae: Post Polio with Progressive Muscular Weakness (PPMA) and Musculoskeletal Symptoms of PPS (MPPS).

- PPMA refers to neurological symptoms, such as weakness, cramps, and pain in both previously affected and unaffected muscles.<sup>12</sup>

- 
- MPPS involves a decrease in functioning due to joint pain, instability, ligament strain, possibly tendonitis, bursitis, and muscle deconditioning. These symptoms are “wear and tear” problems.<sup>12</sup>

## CRITERIA FOR DIAGNOSING PPS

The proper diagnosis of Post Polio Sequelae is as debated as its definition. At present there is **NO** clinical diagnostic test that a physician, physiotherapist, or any other health care professional can use to positively identify a person as having PPS.<sup>13</sup> Using electromyographic studies and muscle biopsy, it is possible to tell whether someone had polio or not, but it is not possible to distinguish between patients with and without new weakness.<sup>14</sup> At present, the best a physician can do is rule out all other causes of new problems and adhere to the following criteria for diagnosing PPS.

### Criteria for the diagnosis of Post Polio Sequelae:

- 
- A prior episode of paralytic polio confirmed by history, physical exam, and typical findings on an electromyographic (EMG) study.
  - Standard EMG evaluation demonstrating changes consistent with prior poliomyelitis: increased size (amplitude) and length (duration) of motor unit firing, more and larger bursts of electrical activity sometimes maintaining a steady low level and, in weak muscles, a decrease in the number of motor units involved in a maximum muscle contraction.
  - A period of neurologic recovery followed by an extended interval of functional stability preceding the onset of new problems. The interval of neurologic and functional stability usually lasts 20 or more years.
  - The gradual or abrupt onset of new neurogenic (non-disuse) weakness in previously affected and/or unaffected muscles. This may or may not be accompanied by other new health problems, such as excessive fatigue, muscle pain, joint pain, decreased endurance, decreased function, and atrophy.



- Exclusion of medical, orthopaedic, and neurological conditions that might cause the health problems listed in #4 above.<sup>15</sup>

## COMMON SYMPTOMS

Up to 50% of polio survivors are experiencing new symptoms.<sup>16</sup> The commonly reported new problems are:

**General fatigue**

**Muscle Weakness**

**Muscle Atrophy**

**Muscle Pain**

**Joint Tissue/Structure Pain**

**Sleep Disorders**

**Dysphagia**

**Respiratory Difficulties**

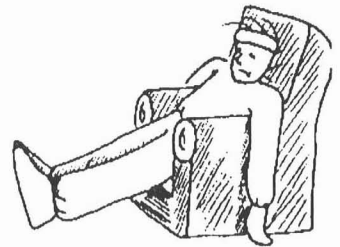
**Decreased Activity Level**

**Cold Intolerance**

The next section will describe these common problems.

### Fatigue

*Fatigue* is divided into general fatigue and localized muscle weakness and is found in about 60% of those experiencing the late effects of polio.<sup>17</sup> This fatigue and muscle weakness is not only experienced in previously affected muscles but also in those thought to be unaffected.<sup>7</sup> Therefore, it seems reasonable to assume that these previously unaffected muscles were actually mildly affected or had involvement beyond that which could have been clinically identified at that time.



✓ Such fatigue is associated with headaches, weakness, hot and cold flashes, and sweating. It is, at times, so severe and sudden that the episode is often referred to as



hitting the “POLIO WALL”.<sup>18</sup> It is because of this fatigue that some polio survivors perform at a lower level of function than the non-affected population of the same age.<sup>19</sup>

*Fatigue is experienced more often in the late morning and/or early afternoon.*<sup>19</sup> This can be very threatening to polio survivors as “hitting the wall” can occur when least expected, such as while driving a car.

*Whole body general fatigue is not related to any systemic metabolic abnormality.*<sup>20</sup> Recent research has shown that the fatigue is related to an impairment in the brain’s ability to activate itself.<sup>21</sup> Such an impairment is caused by lesions in an area of the brain called the reticular activating system (RAS). This area controls arousal, attention, cognition, and memory.<sup>21</sup> This helps in explaining why some polio survivors have trouble maintaining attention and processing information.<sup>22</sup>

## Muscle Weakness

***MUSCLE WEAKNESS IS ENTIRELY DIFFERENT FROM GENERAL FATIGUE.*** Localized muscle weakness is due to the initial compensatory measures undertaken by motor neurons after the acute attack of the virus. Remember, to compensate for the motor units that were destroyed by the virus, the surviving neurons sprouted collateral terminal axonal endings. These collateral sprouts are now at the greatest risk for further pathological changes.<sup>23</sup>



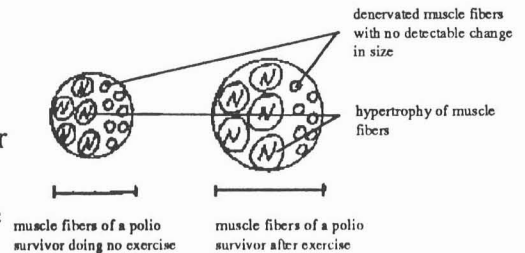
Recovery of strength appeared to be 100% or through the manual muscle testing scheme, a grade 5. But to function at a grade 5 level of strength only 75% of true normal is required, and grade 4 only 40%.<sup>24</sup> Thus, those muscles which appeared to be fully

recovered may have actually possessed considerable cell loss and were weak. To function in the normal activities of daily living, a polio survivor's muscles then had to work much harder than normal unaffected muscles.<sup>24</sup>

Now 30 to 40 years later, the hyperfunctioning motor units, after being subjected to such overuse, can no longer maintain the metabolic demands which are placed upon them. Disintegration at the terminal endings occurs and the result is transmission difficulties between the motor neurons and their corresponding muscle fibers. Evidence supporting this has recently been found by Dr. Trojan and her colleagues. Using EMG studies on weakened muscles, they found an increase in low level electrical activity called jitter.<sup>13</sup>

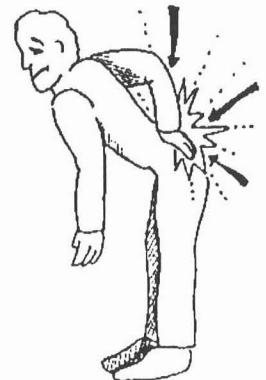
## Muscle Atrophy

As the terminal endings drop out and their muscle fibers become denervated, these fibers waste away, also called *muscle atrophy* and the physical size or girth of the muscle may be decreased. However, the outward appearance of a limb may not be substantially changed, as other muscle fibers may increase their individual sizes (hypertrophy). The affected muscle fibers can be very deep in the muscle or the entire muscle may be deep in a limb. Thus, any new atrophy may be undetected.



## Muscle and Joint Pain

Directly related to muscle denervation, weakness and atrophy is *muscle and joint pain*. Muscle and joint pain can be experienced in many locations, such as in the back, neck, shoulders, and legs. **Muscle pain** often accompanies exercise,<sup>17</sup> particularly if fatigue results from the exercise.<sup>25</sup> Weakened muscles tend to become overstretched and therefore even weaker.



Stronger muscles, having to compensate, become shortened and overworked.<sup>26</sup> During physical activity, stronger muscles are often substituted for weaker muscles. Because of damage to the sympathetic nervous system, which controls unconscious body functions, the increased production of waste products in muscles may not be efficiently removed by your circulatory system's veins, resulting in muscle pain. Sufficient rest periods during and after physical activity will decrease this muscle pain.

**Muscle weakness and atrophy produces pain by causing:**

postural imbalances	muscle strains (myositis)
ligamentous instability	inflamed bursae (bursitis)
improper bone and joint alignment	inflamed tendons (tendonitis)
muscle cramping	increased waste products in muscles <sup>26</sup>

One other theorized cause of pain has been researched by Bruno et al. It is hypothesized that pain felt by polio survivors may be the result of a decreased production of enkephalins (neurotransmitters involved in pain perception) by a reduced number of enkephalergic neurons in the spinal cord and brain.<sup>21</sup> Just as the polio virus affected motor neurons in the spinal cord and brainstem, other motor neurons of the central nervous system were susceptible.

**Pain in joint tissues and surrounding structures** is the result of "wear and tear". Improper body postures place excess forces on joint tissues and structures resulting in their physical injury and the perception of joint pain.

Muscle and joint pain can be limited and/or prevented. The section, *Coping With the Late Effects of Polio*, will describe how to accomplish this.

It is not only muscles used in limb and trunk movements that may undergo some denervation. The polio survivors who had cranial nerve damage during the acute attack of the polio virus (bulbar poliomyelitis) are reporting new *swallowing difficulties (dysphagia)*, *sleep disordered breathing*, and *general respiratory problems*.

## Dysphagia

**DYSPHAGIA**, difficulties in swallowing, is due to pharyngeal and laryngeal muscle weakness, a result of bulbar neurons in the brainstem, being destroyed or damaged during the acute attack of the virus.<sup>27</sup> However, abnormalities in oropharyngeal function also are reported in those without a known history of bulbar polio.<sup>28</sup> Dysphagia can pose a major problem at meal time, and its negative effect is increased with fatigue.

**Dysphagia is identified by:**

- a modified video barium swallowing test,
- a stress test,
- tested when fatigued,
- tested with different foods,
- and tested after a full meal.<sup>28</sup>

## Respiratory Problems

Those experiencing breathing difficulties, day and/or night, often complain of headaches in the morning. These headaches are theoretically caused by central sleep apnea (brief stoppages in breathing during the night). Proper diagnosis is very important as those polio survivors who experience such respiratory difficulties are at risk from death from cardio-pulmonary failure if not treated appropriately.<sup>29</sup>



"Not another sleepless night!"

**Diagnosis of sleep disordered breathing is done by: spirometry, non-invasive gas monitoring, and ambulatory polysomnography.<sup>29</sup>**

In both cases, the effect of the virus initially may have resulted in sub-clinical signs of dysfunction, but with the slow deterioration and denervation presently occurring, such difficulties in breathing, sleeping, and swallowing are only now becoming apparent.

## Cold Intolerance



Another very common symptom reported by polio survivors is **cold intolerance**. Sensitivity to the cold can be so intense that wearing shorts in the summer is almost an impossibility, and trips to the grocery store or any other air conditioned building requires clothing appropriate for a cool fall day. Skin discoloration accompanies this intense feeling of cold. It is usually the distal limbs which are affected first and the skin turns reddish violet to a deep dark blue violet.<sup>30</sup>

The cause of the intense sensitivity to the cold is an impairment of the neurons which unconsciously control the dilation or expansion of the veins just underneath the skin.<sup>30</sup> When the veins are enlarged and filled with blood, heat is lost and the cooling nerves and muscles show decreased functioning. Normally when it is cold, the hair on your arms and legs stand up. The erect hairs trap air and create a warm blanket of air next to your skin. For some polio survivors, the nerves controlling their body hair may be damaged and unable to perform this function. Thus, when feeling cold, some polio survivors have a decrease in mobility, in manual dexterity, and in their overall body functioning.<sup>30</sup>

## Decreased Activity Level

The last symptom, which is a result of the others previously mentioned, is a **decreased activity level**. General fatigue, muscle weakness, muscle pain, joint pain, and

even cold intolerance, all contribute to difficulty in performing ordinary physical activities, such as going for a walk, climbing stairs, or even doing everyday activities around the home. General fatigue and muscle fatigue may physically prevent a polio survivor from doing some routine activity. The fear of experiencing more muscle and/or joint pain, or of being constantly cold, may prevent polio survivors from performing activities that they wish or have to do. Strenuous activities previously performed, such as climbing several flights of stairs, walking 5-20 miles while hunting, playing golf without a golf cart, or canoeing, may require changing normal routines or giving up the activity entirely. If you do wish to continue with certain activities it is essential to remember this rule of thumb: *rest twice as long as you exercise or perform any physical activity*. Resting will decrease pain in muscles and joints and decrease general fatigue and muscular fatigue, allowing you to continue with your hobbies and activities of daily living.

## RISK FACTORS

Who is most at risk for developing the late effects of polio? *The reason why some polio survivors get PPS and others do not is not yet known.*<sup>4</sup> There are several factors associated with the acute attack of the virus which appear to be related with the development of PPS.

These are:

**paralysis/paresis in all 4 limbs**

**length of hospitalization**

**use of an iron lung**

**onset after the age of 10.**<sup>11,12</sup>

There are other factors which are related to the development of PPS. These include:

**length of time since the acute infection**

**presence of permanent residual impairments.**<sup>16</sup>

Recent research by Trojan et al has contradicted some of these factors. Dr. Trojan

has found that the severity of the initial motor unit involvement, the normal aging process and the level of overuse are predictive factors for PPS development. **No correlation to sex, the degree of recovery, weakness at best point after polio, nor level of past physical activity, was found.**<sup>6</sup> Women may present more symptoms because women are more likely to report them to their health professionals and seek help earlier and more often than men, for any health problem.

## RECOVERY FROM THE LATE EFFECTS

The World Health Organization (WHO), in 1980, set out an international classification for describing impairments, disabilities, and handicaps.

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***Impairment:*** any loss or abnormality of psychological, physiological or anatomical structure or function

***Disability:*** any restriction or lack (resulting from an impairment) of ability to perform an activity in the manner or within the range considered normal for a human being.

***Handicap:*** a disadvantage for a given individual, resulting from an impairment or disability, that limits or prevents the fulfillment of a role that is normal (depending on age, sex, social and cultural factors) for that individual (World Health Organization, 1980).<sup>31</sup>

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Rehabilitation after the acute attack of the polio virus enabled polio survivors to reach or achieve different levels of independence. Maynard describes three patterns of emotional reaction to living with a disability, these are: passers, minimizers, and identifiers.<sup>32</sup> These are not distinct labels and are not meant to be negative in any way. They were only designed to group people in terms of their coping techniques after recovery from the polio virus.



**Passers**.....were those polio survivors that had a mild disability which could be consciously or unconsciously hidden. This allowed them to put the disease in the past.<sup>32</sup>

**Minimizers**.....were moderately disabled and therefore had to use adaptive equipment and make lifestyle changes to adapt to their specific needs. They minimized their physical disability.<sup>32</sup>

**Identifiers**.....were severely disabled and generally needed a wheelchair. They needed to fully identify with their disability in order to cope with various adaptations and lifestyle changes.<sup>32</sup>

## COPING WITH THE LATE EFFECTS OF POLIO

In all situations, polio survivors used various coping techniques to deal effectively with their disability. This is going to be just as important now, for all polio survivors, but particularly for those dealing with the late effects. Throughout the rehabilitation process and in later years, adaptation rather than full recovery occurred. This is synonymous with the late effects of polio. When experiencing any combination of the symptoms of the late effects, it is important to realize that it is possible to *change your lifestyle*. With the help of friends, family and health care professionals, adapting to the late effects is an achievable goal. In the next two sections we will suggest resources, adaptive techniques and devices which will help in adapting to the late effects of poliomyelitis.

## THINGS YOU CAN DO

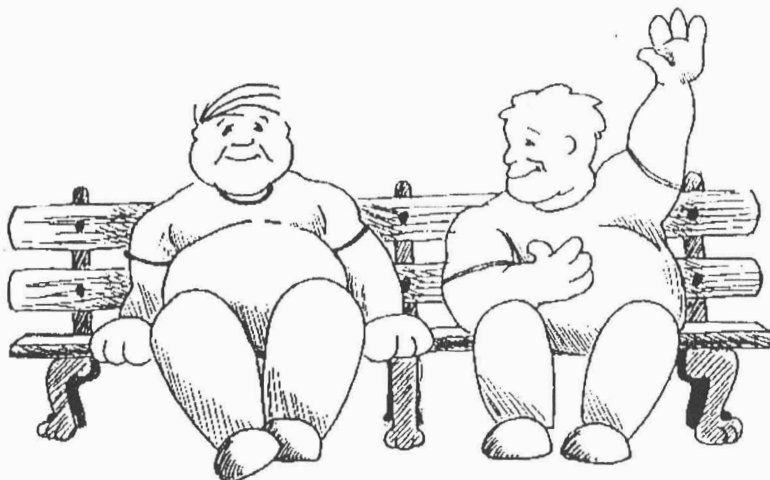
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Coping with the late effects is entirely up to you. Only you can take the following suggestions and apply them to yourself.

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## DIET

Controlling your diet is extremely important. For many people, the word diet is truly a four letter word and immediately brings negative connotations to mind. The dictionary definition of the word diet is limiting your daily food intake **and** anything you usually eat or drink.<sup>33</sup>



"My doctor said that because I am overweight, I can either lose weight or gain height. I decided to gain height!"

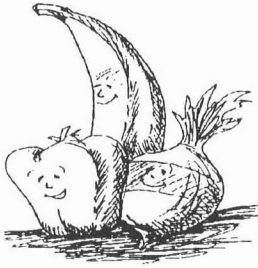
*Consider your daily diet as a positive thing and as something that you can control.*

Excess body weight adds unwanted physical stress to your body, particularly to your joints, lower back and muscles.<sup>34</sup> The excess weight reduces energy as your body now has to work harder to carry the additional load. Excess weight also places further stress on the respiratory system and can complicate breathing, particularly if respiratory difficulties already exist.<sup>34</sup>

Generally with age, a person's activity level decreases. For those polio survivors following the ideology of "*Conserve it to preserve it*", this decrease in activity level is

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even more pronounced. It is because of this that your diet must be monitored to avoid excess weight gain. This does not mean that you automatically stop eating or go on one of the many fad diets as endorsed by sports and television stars. Anyone can write a book about weight loss, but that does not mean that it is the best or safest method.



*The important thing is to maintain a well balanced diet.*

Following the Canada Food Guide is a good place to start, as this will ensure that you get the required vitamins and minerals. However, for those polio survivors who have reduced activity levels or use a wheelchair, following the Guide may cause an increase in weight due to the high number of calories allowed. Smaller portions is a better way to limit calories rather than by neglecting food groups.

The Metropolitan Life Tables, as put out by the Metropolitan Life Insurance Company, presents the appropriate heights and weights for men and women, ages 25-59.<sup>35</sup> These tables are available from the Abilities Foundation of Nova Scotia and from the Kellogg Library at Dalhousie University (see References). Following these tables can be very deceiving. The tables give approximate ranges of weights for each height. For the general population, carrying an extra 2-5 kg is not a problem, but for those polio survivors enduring fatigue and muscle weakness, the excess weight affects them more dramatically. It is better to consider your own HEALTHY weight rather than your ideal weight. Consultation with a dietitian or nutritionist will help you to find your healthy weight. A quick method of determining your healthy weight is to use your waist to hip measurement ratio. If your ratio is high, over 0.8 for women and 1.5 for men, then you are not at your healthy weight.

Simple method: waist measurement  
                    hip measurement

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For a polio survivor experiencing weakness and fatigue, every 2.2 kg of excess weight is like carrying 8.8 kg.

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One of the most important minerals in your diet is calcium. Calcium is used in muscle contraction, nerve conduction, and is required for healthy teeth and bones. To

strengthen bones they must be stressed. Stresses are gained from exercise, weight bearing, and from the activities of normal life. Normal aging people, and more so women going through and after menopause, experience bone loss or weakness called *osteoporosis*. For polio survivors with muscle weakness, this loss of bone increases the risk of fractures. Thus, it is vital to ensure the proper daily intake of calcium.

### **Dietary advice for polio survivors**

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- Diet control is up to you. Take an active role in watching what you do and do not eat.
  - Enjoy the food you eat. There are many good cook books which can help spice up your diet while still watching what you eat. Turn this into something positive.
  - Do not neglect food groups to reduce calories. If necessary, eat smaller portions.
  - Keep a daily journal of everything you eat. This will give you feedback on what you are eating.
  - Talk with a qualified dietitian or nutritionist (as recommended by your support group). Presenting your daily food journal will help them in evaluating and, if necessary, altering your diet.
  - Avoid fad diets. Short term weight loss is not good enough. Lifestyle changes may be necessary to maintain your healthy weight.
  - Avoid excess alcohol consumption. Alcohol contains many calories. Also, drinking to excess, combined with fatigue and muscle weakness can lead to accidents and injuries.
- 

## **CONSERVATION OF ENERGY**

Polio survivors with muscle weakness often perform daily activities at the same

level as others. However, because their muscles are working harder to do the same work, they are working much closer to maximum than non-polio persons.<sup>36</sup> Even the smallest amount of physical activity can result in severe fatigue and muscle weakness. Symptomatic polio survivors have a greater difficulty in recovering from an exhausting activity.<sup>36</sup> Such activities should be avoided or decreased. Because of this, the conservation of energy has to be one of the main priorities of polio survivors.

## Pacing Activities

*One way in which you can conserve energy is through the pacing of activities. You can feel when you are becoming fatigued and you can use this knowledge to pace your activities.*<sup>36</sup>

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Those polio survivors who pace their activities through frequent rest periods have less muscle fatigue, have an increased capacity to do their daily activities, and recover quicker from activities.<sup>37</sup>

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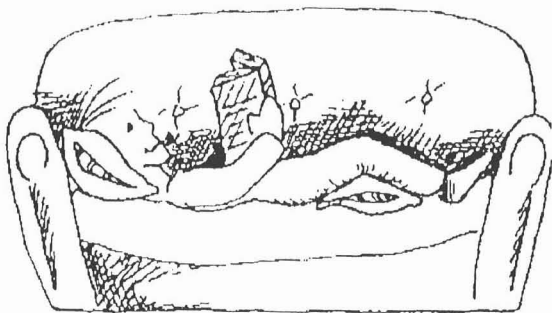
## Use A Daily Planner

Since fatigue often peaks in the late morning and early afternoon these are the suggested rest times. *Try using a daily planner to plan your activities.* This will help in finding the most appropriate rest times for you.

Using a planner will help in prioritizing your activities. Once you recognize the activities that are the most exhausting, prepare for them. For example, if you know that you are going out later in the evening, then reduce your activity level during the day and take more rest periods. This will help to keep a reserve of energy for that later event.

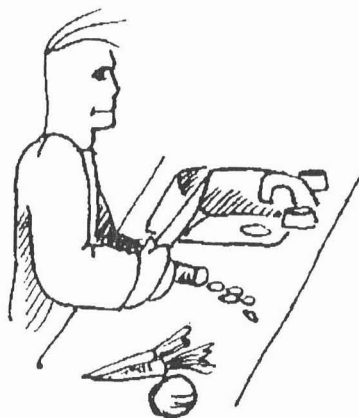
## Resting

*When deciding to take a rest period, try to lie down.* Watch television or read a book while lying down. Lying down conserves the most energy. Be sure to maintain good posture when resting. You may want to put a pillow under your knees to take some pressure off your back.

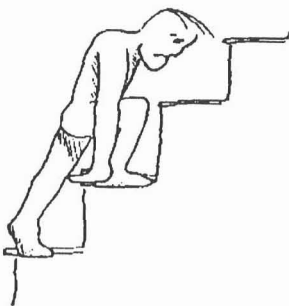


## Sitting

Sitting is another energy conservation technique useful for polio survivors with leg and/or trunk involvement. *Sit whenever you can.* Instead of cutting up and preparing meals while standing at the kitchen counter, sit at a table or use a chair at the counter. There are many adjustable chairs and stools available from numerous office supply stores. An adjustable chair with wheels is very helpful.



## Climbing Stairs



One of the most important lifestyle changes involves the climbing of stairs. Climbing just one flight of stairs can leave you feeling exhausted. If an elevator is present then use it, even if you are only walking up or down one floor. If stairs cannot be avoided, plan activities so as to limit your trips up and down the stairs.

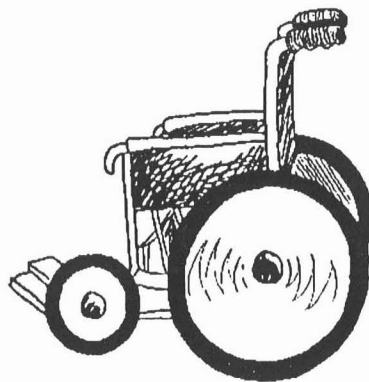
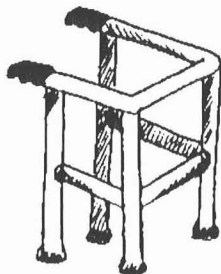
## Carrying Objects

When carrying items around the house, such as groceries, use a cart or have your groceries delivered.

## Aids/Orthotics

The use of *ambulatory aids and orthotics* is another important energy conservation measure. Many polio survivors spent hours of rehabilitation to rid themselves of highly visible and often ugly devices present at the time of the acute attack. Returning to their use can be very devastating and appear as a failure. This is particularly difficult for the “passers” and “minimizers”. Visions of bulky wheelchairs, and ugly shoes immediately produce fear and anger. Polio survivors have spent their entire lives, consciously and unconsciously, hiding any form of disability from everyone else, trying to appear non-disabled. They have “looked so good and felt so bad.” Now they may simply refuse to use any sort of aid.

But look at the *benefits*. Many of the late effects of polio, such as muscle and joint pain and even respiratory problems, are the result of postural deficits or poor body or limb alignments. Using such devices as ankle-foot and knee orthoses will correct abnormalities in walking patterns. Yes, drop foot and back knee can be limited. When your body, especially your legs and trunk, are in a balanced posture, your muscles can work more efficiently and you will have less pain in your muscles and joints. Ambulatory aids, such as canes, crutches, walkers, scooters, wheelchairs and most modern orthoses are made of new space age materials and are extremely light. Scooters and wheelchairs can be used for shopping but may not be needed for all activities. Ankle-foot orthotics are small enough to be easily hidden under pants and in shoes. Many healthy people are now wearing footwear made for the human foot, such as clogs and certain styles of sandals, so you will not be alone in your footwear.



Using aids also help in preventing falls which could result in serious injuries. What aids are appropriate for you? Consultation with a physiotherapist, occupational therapist, and/or physiatrist (physical medicine doctor) can help determine this.

## **Devices For Home And Work**

There are many neat little gadgets for both the home and workplace which can help in the conservation of energy. Using an adjustable chair with wheels in the work place and around the home will allow you to move around more easily, while remaining in a seated position. Long handled dustpans will save you the trouble of bending to the floor. Numerous types of grabbers are available to make reaching and dressing less of a chore.

Many of these energy and time saving tools are available at local medical supply stores around the area and a list of some of them can be obtained from the Abilities Foundation of Nova Scotia (429-3420) or by referring to the Yellow Pages.

Talking to other polio survivors will give you many ingenious ideas that you can use. Other polio survivors have often tried many ways to make things much easier and are only too happy to share such ideas. To access these ideas, join a polio support group.

Occupational therapists can recommend the most appropriate aid(s) for you.

## **Drugs**

Fatigue may respond to drug therapy. Currently, one such drug is Mestinon. Ask your doctor if this drug is appropriate for you. Also, consult with a pharmacist about its effects and reactions to other drugs that you may be taking.

Certain drugs can complicate the late effects of polio. Sleeping pills, muscle relaxants, and anaesthetics can increase respiratory difficulties for polio survivors who have had a history of bulbar poliomyelitis. If possible, try to avoid such drugs and consult your health professionals about alternative methods.



## ENERGY CONSERVATION

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- Remember, with muscle weakness your muscles have to work much harder than normal unaffected muscles. Energy conservation is a must.
  - Plan your activities. This includes rest periods.
  - Prioritize your activities. This will maximize your usefulness when performing them.
  - When resting, try to lie down.
  - Sit, whenever you can, when performing tasks.
  - Use proper body mechanics. Proper body mechanics places less strain on your muscles and joints. This may require the use of various orthotic devices or gadgets as recommended by your occupational therapist..
  - Use ambulatory aids when moving for long periods of time or long distances.
  - Find out about all the new devices which can make work around the home and work-place easier.
  - Look at the positive rather than the negative. Aids are, by definition, designed to help not hinder. Make them work for you.
  - Ask your doctor about alternative treatments, such as drugs.
- 

## EXERCISE

Exercise plays an important role in the lives of everyone. For polio survivors, the type of exercise and the duration of that exercise are important factors to consider. Before starting any exercise regime, a full physical evaluation should be performed. This is done by your family physician and a physiotherapist. A full assessment will determine your level of functioning in terms of fatigue, muscle strength and posture. This will help

in tailoring your exercise or treatment program.

## Stretching

Weakened muscle become overstretched and therefore even weaker. To compensate, the stronger muscles shortened and are now overworked.<sup>26</sup> The muscle shortening is a form of adaptive shortening which may result from:

- immobilization
- restricted mobility
- connective tissue or neuromuscular disease
- tissue pathology due to trauma
- congenital and acquired bony deformities.<sup>38</sup>



Prolonged immobilization can occur after surgery or after wearing a cast or splint for an extended period of time. Many polio survivors can recall, almost to the day, when they started to experience the late effects. This usually occurred after surgery, a fracture or some other injury. Adaptive shortening can be the result of excess weight gain. There is not always a defined physical event marking the onset of the late effects of polio, as stress is a leading cause of the late effects of polio.<sup>21</sup>

Stretching can improve adaptive shortening by lengthening pathologically shortened soft tissue structures and thereby increasing range of motion.<sup>38</sup> Stretching also decreases and prevents pain in muscles and joints.<sup>38</sup> There are two types of stretches which will lengthen muscles, passive and active stretches. Passive stretches are performed by a therapist, relative or friend, while active stretches are done by the person themselves. Most stretches at home are more easily performed actively.

The simplest stretch is what physiotherapists call *contract-relax or hold-relax*. This involves moving a muscle to the point at which a slight stretch is felt and then

holding that position for 30 sec. You then relax slowly, rest for the same period of time and repeat the stretch. *It is very important not to overstretch muscles as this can result in more muscle damage and pain.* Overstretching can lead to hypermobile joints which are more unstable. Contained in the back of this book is a list of suggested stretches, but before doing any of them consult a physiotherapist.

CONTRACT — HOLD 30 SEC — RELAX 30 SEC — REPEAT (2-3X)

## Strengthening

After your initial bout with the polio virus extensive rehabilitation followed. This consisted of numerous stretching and strengthening exercises. Many of you kept up a vigorous active life and this overuse may be causing new fatigue and weakness. To limit the episodes of fatigue, conserving it to preserve it became a way of life. This inactivity can lead to even weaker muscles through a process called atrophy from disuse. However, too much exercise can lead to further muscle damage and increased weakness.<sup>39</sup>

So what do you do?

The first thing is to get a full evaluation on the present strength of your muscles.

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Exercise will only increase your strength and endurance if your muscles have a reserve of strength above and beyond what is required for daily activities. Exercising any muscle which has no reserve will only cause more damage, as it is already functioning at maximum capacity.<sup>40</sup>

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To determine if a muscle is working at its maximum, that muscle must be able to function against gravity, and be tested 2 or 3 times, after a 1-2 min. walk. If there is any decline in strength after testing, then that muscle has no reserve.<sup>40</sup> Those polio survivors experiencing late effects of polio should be reassessed every three to six months to safeguard against overwork weakness from the exercise.<sup>41</sup>

Most exercises to increase strength can be done at home and doing them will not exacerbate your late effects of polio.<sup>42</sup> Performing short isometric (contraction of a muscle without moving the joint) or progressive resistive exercises 5-6 times daily will

# INJURY CONTROL CHECK LIST

## Intervention:

\_\_\_ Family physician or Post polio physician to contact for consultation

Name \_\_\_\_\_ Telephone \_\_\_\_\_

\_\_\_ Advocate who will meet me at the Emergency Room or treatment facility

Name \_\_\_\_\_ Telephone \_\_\_\_\_

\_\_\_ Friend/Relative familiar with your case history

Name \_\_\_\_\_ Telephone \_\_\_\_\_

\_\_\_ Post polio literature collected and collated to give to Health care Professionals.

\_\_\_ Post polio organization to call for support information

local support group -- Telephone \_\_\_\_\_

International polio Network -- telephone 314-534-0475

\_\_\_ Local Center for Independent Living to contact for information about financial, medical, and other support services and products available.

Name \_\_\_\_\_ Telephone \_\_\_\_\_

\_\_\_ Optimism and flexibility available on demand!

## Prevention

\_\_\_ Energy conservation and pacing is part of my routine.

\_\_\_\_\_ Home safety inspection and upgrade completed if necessary.

\_\_\_\_\_ Assistive devices checked and upgraded regularly.

\_\_\_\_\_ Safety precautions considered before traveling outside the home.

\_\_\_\_\_ Personal wellness/fitness needs are considered and addressed.

\_\_\_\_\_ I'm positively focused on living every day in strength, health, and wellness and never really plan to use this list!

# DAILY LOG

Copy This

NAME: \_\_\_\_\_

DATE: \_\_\_\_\_

6:00
7:00
8:00
9:00
10:00
11:00
12:00
1:00
2:00

3:00

4:00

5:00

6:00

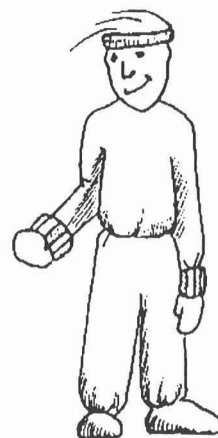
7:00

8:00

9:00

10:00

increase strength.<sup>43</sup> High resistive, short duration, weight training exercises will increase strength.<sup>44,45</sup> Most of these exercise can be done using a cuff weight or a can of soup, held or attached to the limb in some way. Cuff weights can be purchased from most sports stores around your area. Consult your physiotherapist for the most appropriate strengthening exercises for you.




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When doing any sort of exercise it is important to listen to your body. You know when you are beginning to feel fatigued and at this point you should stop.<sup>46</sup>

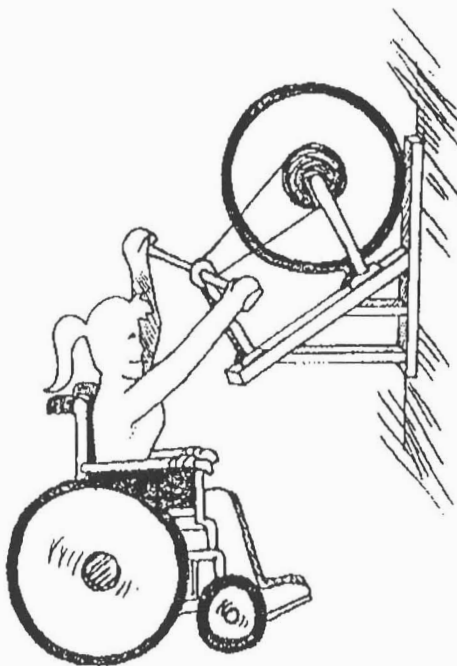
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Modified aerobic training will help in increasing muscular and cardiovascular endurance resulting in decreased fatigue and pain.<sup>39,40</sup> Training is modified via rest periods. When performing aerobic training frequent, rest periods throughout will decrease fatigue while you still benefit from the training. Doing 5 minutes, 5-6 times daily, of any exercise which increases your heart rate, will increase your cardiovascular endurance.

### **The following is an aerobic training program.**

- 
- The intensity of the aerobic training is based on your target heart rate.
  - Your target heart rate is: 220 minus your age times 45-80%. Example: 40 years old at 65% maximum, target heart rate is 220-40 times 65%, equalling 117.
  - Duration of exercise is 15-30 min./session, initially broken down into four minute periods of exercise and one minute of rest. *If you experience muscle pain and/or fatigue during the exercise, you should rest for up to 1.5 x the amount you exercise.*
  - Frequency is 3-4 times per week on alternate days.
  - How you exercise depends on your function. Cycling and swimming are recommended and arm exercycles can be used for those using a wheelchair. An arm exercycle can be made from an old bicycle. Ask a friend, good with their hands, to help build one.
-





**REMEMBER:**

**If you experience pain when doing any exercise, stop immediately and consult your physiotherapist.**

**OR**

**If post exercise muscle soreness lasts longer than 2 hours after exercise, stop the exercise and consult your physiotherapist.**

## PAIN MANAGEMENT

Preventing and decreasing pain is a never ending task. Polio survivors are constantly aware of how activities affect their bodies.

Joint and muscle pain frequently occur during and after exercise or after performing activities.<sup>17,25</sup> This pain can be dramatically decreased by correcting postural imbalances.

To correct postural imbalances:

*stretch muscles*

*strengthen weak muscles*

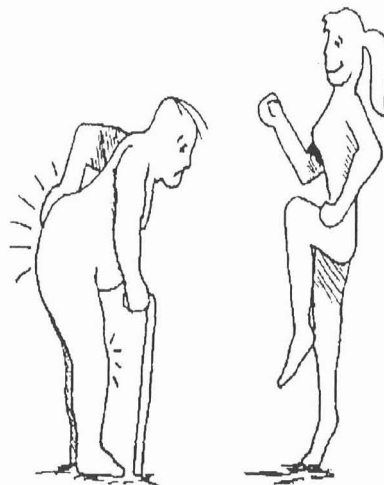
*use orthotics*

*use ambulatory aids (walkers, crutches,  
canes, wheelchairs)*

*reduce excess weight*

*re-educate gait patterns and sitting postures*

*place a flat piece of plywood between  
your mattresses when sitting on your bed*



- Avoid activities which cause pain. If muscle or joint pain results after an activity or after exercise, moist heat, non-steroidal anti-inflammatory drugs (NSAIDs), ice, or analgesics, such as aspirin, can all help to reduce this pain. ***Muscle relaxants and alcohol can increase fatigue and should be avoided.***<sup>17</sup>
- Pain management is achieved with the help of your physician or physiotherapist. These health professionals can help to decrease pain through massage, acupuncture, transcutaneous electrical stimulation (TENS), ultrasound, and joint mobilization.

- Relaxation techniques also help in chronic pain management. Your physiotherapist can help in choosing the most appropriate technique for you.
- Get a referral to a chronic pain management group. Such a group is designed to help people cope with chronic pain. Your doctor can refer you to this group.

## STRESS

Stress is anything in our lives that we find challenging, demanding, or threatening. With this in mind, it is easy to see how facing the possibility of, or experiencing the late effects of polio can cause stress. One of the main causes of PPS is emotional stress (Bruno et al). Stress may be inhibiting the brain's reticular activating system resulting in increased levels of fatigue.<sup>21</sup> *Thus, it is important for polio survivors to control and cope with the stress in their lives.*



Everyone experiences stress. As human beings, we have evolved to deal with stress in a physical manner. But the late effects of polio are not physical things which you can strike out against. The stress evolves from dealing with a chronic problem. You start to experience many different feelings, such as:

*fear* of the late effects,

*anger*, "Why is it happening to me, again?",

*worry* that I may need to ask for more help,

*denial* this is not really happening to me,

*guilt* about changes in lifestyle,

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*depression* concerning the negative way the late effects are affecting you, and *concern* that you continue to have the courage to cope.

To effectively deal with stress you must fully understand the problem. This resource booklet will help to educate you on the late effects but it is up to you to do it. Seeking help from a psychologist or from reading books on coping with stress will aid you in this task.

Many polio survivors are overachievers, so having the courage to cope is not a new experience. You must remember that the late effects of polio is relatively new. It will take work by you, your family and friends, and your attending health professionals, in helping you cope with the late effects of polio.

**Caution:** Some of the mood uplifting drugs (anti-depressants) may enhance fatigue and should be avoided.

### **Steps in learning to accept the late effects of polio.**

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- 1) Period of mourning. It is during this time that you question many things and feel the strongest emotions. Emotions such as anger, fear, depression, denial, and resentment, are a normal way of coping with the changes at this time
- 2) Devaluing physique. It becomes important to place less emphasis on your physical appearance. Doing this will allow you to accept the use of orthotics and other aids more readily.
- 3) Enlarge your scope of values. Focus your attention on the things that you can do and not what you are unable to do. Find thing that you can do, while letting go of others. Find new hobbies or new ways of doing your current activities.
- 4) Uphold asset evaluation. Do not compare yourself to everyone else. Setting your physical standards against a person not experiencing the late effects may be a very unrealistic goal. You are valued for who you are, not for what you do.<sup>47</sup>

## SLEEP DISORDERED BREATHING AND DYSPHAGIA

Sleep disorders in the form of breathing problems and dysphagia can be very dangerous if not constantly monitored or treated.

Sleep disordered breathing is treated with a nasal continuous positive airway pressure ventilator or tracheostomy during the night<sup>29</sup>. Use of such a ventilator will allow sufficient oxygen to be taken in, preventing the headaches associated with sleep apnea. Sleep apnea is treated with drugs, such as protriptyline. Referral to a respiratory therapist will determine the most appropriate treatment for you.

Try to cut down on or quit smoking. Smoking increases breathing difficulties, and causes other respiratory problems, such as emphysema and bronchitis.

When visiting a doctor or dentist, make sure you inform them that you are a polio survivor, and of any late effects of polio that you may be experiencing. Anesthetics, pain killers, and muscle relaxants used during and after surgery or oral work can worsen episodes of sleep disordered breathing, dysphagia, and other late effects. Sleeping pills should be avoided as they can increase breathing difficulties during the night.

Treatment of dysphagia is done through a speech-language pathologist.<sup>48</sup>

### Guidelines for treatment of Dysphagia

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- If you have difficulty swallowing, get a referral from your family physician for a modified barium swallowing study. This will determine the cause of the problem.
- Something as simple as tilting your head while eating may help to relieve swallowing difficulties. Referral to a speech-language pathologist will help in identifying other simple rehabilitation techniques.
- When fatigued, avoid eating. Fatigue exacerbates swallowing difficulties.
- Be reassessed at regular intervals. This will determine the effectiveness of treatment or coping programs.

- 
- Measures of pressures and flow rates during swallowing will help determine your specific weaknesses.<sup>48</sup>
- 

## TALKING WITH HEALTH PROFESSIONALS

Visits to the doctor or any other health professional can be very difficult. You must remember that the last polio epidemic occurred forty years ago so it is unlikely that you'll find someone experienced in treating polio. Many health professionals are just as in the dark about the late effects of polio as the general population. The key is to find someone who has knowledge or is willing to learn about these late effects.



"Hi, I'm your local health professional, and I'm here to help you."

- 
- Talk to other polio survivors and health professionals. Find out who the best people are. Not all health professionals are knowledgeable about the late effects of polio.
  - Be up to date on the latest research concerning the late effects of polio. The Abilities Foundation of Nova Scotia and the local libraries are a good sources for finding this information.
  - Prepare questions to ask the health professional that you are going to see. This will cut down on time for both you and them.
  - Double book appointments. Your initial assessment will usually take longer than the time that is allotted. Your initial assessment is something that you do not want rushed. You may have many questions that may take considerable time to answer.
  - Know your own case history. Health professionals need to know this for a proper diagnosis.
  - Ask advice. Will I benefit more from a cane, crutches, or wheels?

- 
- Dictate your own treatment. If you are not happy with the treatment or respect that you are getting from your health professionals, find others.
  - Before having a full assessment, make sure your physiotherapist or doctor understands what fatigues you and what your endurance is. You do not want to walk in and wheel out!
- 
- Recognize that physicians have to rule out all other possible causes of your health problems before diagnosing you as having PPS. For example, hypothyroidism can mimic many of the late effects of polio.
- 

## KEEPING A DAILY LOG

The purpose of keeping a daily log is to have a written form of feedback on your daily experiences. Photocopy the page, titled **Daily Log**, in the middle of the book, and record all of your activities, including rest periods, that you performed each day for a week. Include on it everything that you eat and drink, when you feel tired, stressed, depressed, and when you feel pain. At the end of each day look at your record; think about ways in which you could have improved or better scheduled your day, to limit these unpleasant episodes. For example, climbing stairs may have fatigued you. Ask yourself whether there was an elevator in the building or not, and if so, why you did not use it.

The daily log will give you something tangible to present to your dietitian, nutritionist, physician, physiotherapist, and other health care professionals. Through this a proper diet, exercise regime, orthotic, and if necessary an ambulatory aid can be prescribed.

Here is an example

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**12:00** lunch—ham sandwich on whole wheat bread, mayonnaise and lettuce, chicken noodle soup, 1 glass OJ, 1 cup coffee with milk. No problem swallowing

---

**1:00** took dog for a walk, 2 blocks felt very tired rested 20 min.

---

## SUPPORT GROUPS

One of the best resources, if available, is a Polio Support Group. All support groups bring together people with a common background or situation. Involvement in a Polio Support Group will enable you to find out who the best health care professionals in the area are, where to get the most efficient aids and orthotics, other tried adaptive techniques, and what other resources are available. Most of all, a polio support group signifies that you are not alone in your struggle.



All people are different. Some people enjoy sharing their experiences, while others simply want information and prefer to do this on their own. Small support groups allow for more interaction between polio survivors. With larger groups, close contact becomes more difficult.

In either situation, it is up to you to find the most beneficial way of using the support group. You can take a very active role in the group by actively contributing to or joining in open discussions, or by requesting more information via outside speakers. If you prefer a more personal level of contact, talk in small groups. Request their phone numbers. This will allow you to talk or meet with them outside of the meetings.

*Each person can access the level of need / support / information by actively seeking it .  
We are our own greatest problem solvers and by sharing, we can become our own greatest resource.*

## FAMILY AND FRIENDS

Your family and friends play a vital role in helping you cope with the late effects of polio. To do this effectively, they must be aware of your pain, weakness, and/or fatigue. Your family and friends may not see the changes in the way you perform your daily activities. They may not understand why you have to limit certain activities or alter



others. It is up to you to inform them on how the late effects of polio are affecting you.

Be honest with them and yourself. Let them know when you need help. Denial that there is a problem never works and trying to perpetuate old lifestyles can be destructive. Involve your family and friends in the activities of daily living, such as picking up groceries or doing the laundry.

Be clear in expressing your needs. Over enthusiastic requests or advice can lead to alienation from your family and friends and a sense of isolation. Family stress causes more problems for polio survivors. Family counseling may work for you. Remember, there will be many changes or losses in your life, but losing your family and friends is not one of them.

Adaptation to your changes in lifestyle takes time, effort, and courage. It is important to be understanding and patient with family and friends. A family is a team. If one person is struggling, it affects everyone.

## RESOURCES TO MAKE YOU ABLE

Consultation with many of the health professionals, such as physiotherapists, occupational therapists, psychologists, and other specialists requires a referral from your family physician. If you think that you can benefit from the expertise of any of the above mentioned health professions, ask your doctor for a referral.

There are many other resources at your disposal that do not require a referral. The following is a list of resources which will make coping with the late effects of poliomyelitis easier if you can use them.

### Home Services

**Hair styling** - Several local hairstylist operate an in-home service. To access this information in your area contact the Association of Nova Scotia Hairdressers:  
Phone: 468-6477.

**Home cleaning** - Housework requires a lot of energy. Get your family to take a more active role in daily chores. Hire someone to do it for you. There are many home cleaning services which can be hired to do this for you. As well, the Canada Employment Agency and the Student Employment Centers will gladly suggest someone you can hire to do the work for you.

**Groceries and Pharmaceuticals** - Shopping is another energy consuming task. Some of the local grocery stores and drug stores offer a home delivery service. Most of them are free of charge.

**Library** - The Halifax City Regional Library offers a service to city residents, which delivers reading and listening material to those unable to visit the library. Material is delivered to your home every three weeks and the service is free of charge. Contact the North Branch Library at 421-8764, Tuesday to Saturday, 9am - 5pm.

**Housing** - Often with changing ambulatory aids comes a need for changes in the design of your house or work place. Funding for adapting your present living area is available through the Nova Scotia Department of Housing and Consumer Affairs. This program is designed to assist people whose mobility is limited to a wheelchair. There are criteria for eligibility and the amount of funding is determined by your income. For more information contact your local Department of Housing and Consumer Affairs.

In the Metropolitan area there are numerous houses available which meet the special needs of people. A list of Housing Registry is available by contacting the Department of Senior Services Centre at 465-5578.

## **Transportation**

Traveling around the Metropolitan area and to the airport can be very difficult for those polio survivors having difficulty walking or using a wheelchair. There are several local taxi cab companies which use customized vans and cars for wheelchair transport. These companies are found in the yellow pages. When traveling to the airport, contact the Airport Transport Services at 462-1228. Call at least 24 hours in advance, 8:30-4:30.

Access-A-Bus provides transportation for residents around the Halifax Metropolitan area. It serves people with ambulatory disabilities and wheelchair users. To register, contact the Metropolitan Authority Metro Transit Division at 421-6609.

Acadian Lines now has a wheelchair accessible bus. Acadian Lines requires at least 72 hours of advance notice.

Renting accessible vehicles. Thrifty's Car Rental has a Dodge Grand Caravan with a remote controlled rear door and ramp. Tilden, at the airport, rents out a car with hand controls.

Thrifty's Car Rental - 422-4455

Tilden - 873-3505

## **Buying a Car**

When purchasing a car, make sure that you test drive it to ensure that there is enough room to store a wheelchair or other ambulatory aid. This may mean buying a mid-size or larger car.

### **Car adaptations**

- A removable wooden platform can be used to fill the rear foot space, to make getting a wheelchair in and out easier.
- Doors should be wide enough to allow for easy transfers from the front seat to the wheelchair.
- The side door posts should be vertical and not slanted. Slanted door posts make loading a wheelchair more difficult.

If you are purchasing a new car, explore all dealerships around the area. Chrysler and Ford both have a program which financially assists the adding of mobility aids to any car or light truck. For more information contact Chrysler's Physically Challenged Assistance Program at 1-800-255-9877 and Ford's Mobility Plus Program at 1-800-565-8985.

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Persons with disabilities can receive a refund on gasoline. The Federal Excise Gasoline Tax Refund Program provides 1.5 cents per litre to persons who meet the following criteria:

*“a person who has been certified by a qualified medical practitioner as suffering from a permanent impairment of locomotion to such an extent that the use of public transportation would be hazardous.”*

To use this service, receipts must be kept and be submitted every six months. For more information contact your local Revenue Canada Excise/GST District Office or phone toll free: 1-800-565-9111.

Parking permits can be obtained for either the driver or passenger of a vehicle. The Department of Transportation and Communication (Registry of Motor Vehicles) will provide you with a parking permit or special plates which will allow you to park in the designated “Disabled / Handicapped Parking Spaces”. To obtain this permit, you must fill out a form from the Department of Transportation and Communication, and have your physician sign it. If you use such parking, be sensible in its use, as they are limited. Ensure that other drivers of the car do not abuse the permit. You want parking available to you, so do worthy others.

## Traveling

When traveling around the province it is suggested that you contact Tourism Nova Scotia or Check in Nova Scotia. Both of these services can give you a list of the hotels, motels, bed and breakfasts and camp grounds which are more “accessible”. These services can make the reservations for you.

Tourism Nova Scotia: 425-5781

Check in Nova Scotia: 1-800-565-0000

When staying at a hotel, motel or bed and breakfast you may wish to inform the front desk that you are a polio survivor and keep the Injury Check List, found in the middle of the booklet, on hand. The Injury Check List should include your family physician and the friend or relative most familiar with your lifestyle changes.

When traveling abroad, many things can happen, such as damaging an orthotic or ambulatory aid. Support groups may be found throughout the province, country, and around the world. Before your trip, you may wish to contact the Abilities Foundation of Nova Scotia or the International Polio Network for contact persons in other support groups.

The Abilities Foundation of Nova Scotia: 429-3420

International Polio Network: 314-534-0475

If traveling by air, you may wish to prearrange, with the airline, for a wheelchair to be on hand for use in the airports both here and abroad. The airline personnel will help you get to and from the airplane. This is particularly important if you have difficulty walking distances with or without luggage.

## **Purchasing Assistive Aids**

If an assistive aid has been recommended or if you think that you may benefit from one, talk to your occupational therapist or doctor. They will know who to contact in your local area about purchasing, renting, and repairing assistive devices. Medical or Health supply stores and drug stores are good resources for finding out about such devices.

## **Government Services**

For more information concerning the resources available in your area contact the Community Services branch of the Nova Scotia government. The local phone numbers can be found in the telephone book under Governments Federal and Provincial.

## **The Abilities Foundation of Nova Scotia**

This resource booklet contains just a few suggestions in helping you cope with the late effects of poliomyelitis. There are many videos, pamphlets, articles, and information kits for you and your health professionals which you can borrow. To find out about these and other resources available around the metropolitan area contact:

The Abilities Foundation of Nova Scotia  
3670 Kempt Road  
Halifax, NS  
B3K 4X8  
Bus: (902) 429-3420  
Fax: (902)-454-6121

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## SUMMARY

Adapting to the late effects of poliomyelitis is all about *change*. Changes in the way you do your daily activities, your diet, your family and friends' roles in your life, and most of all, a change in attitude. Change is a part of life for everyone, and for polio survivors the late effects of polio is just another form of change that you can successfully manage.

Acceptance of the late effects is a must. Denial that challenges exist is more harmful than good. The key is to look at changes in lifestyle in a positive light and as something that you can control. This booklet offers many suggestions which will enable you to effectively cope with the late effects of polio but it is up to you to use them. Remember, you are your own best resource. Only you can do the things necessary to successfully adapt to the late effects of poliomyelitis. Good Luck!



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## APPENDIX

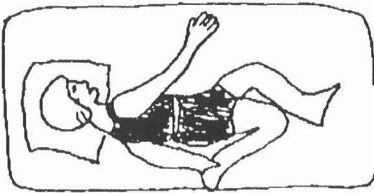
All stretches should be done on a firm bed or on the floor or sitting in a firm chair.

**1) Hamstring Stretch:** Sitting on the edge of the bed with your right leg straight out in front of you and your left one over the edge, bend over your right leg, keeping your back as straight as possible. Hold for 30 sec. Repeat on the other side. Do this 2-3 times.



**2) Quads Stretch:** Lie on your side with your lower knee bent up. Bend your upper knee, keeping the hip straight and pull your heel towards your buttocks with your hand. Hold for 30 sec. Repeat on other side. Do this 2-3 times.

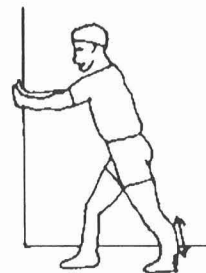
The quads stretch can be done in a standing position using a chair or wall for support.



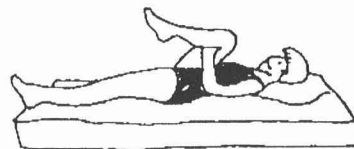
**3) Groin Stretch:** Sit with your knees bent and soles of your feet together, let your knees drop out to the sides towards the floor. Try to keep your back as straight as possible. Slight downward pressure can be placed on your knees using your hands. Hold for 30 sec. Repeat 2-3 times.



**4) Calf Stretch:** Steady yourself against a wall. Bend your left leg, keeping your right leg straight and pushing your heel down until you feel a stretch on the back of your calf. Hold for 30 sec. Repeat on the other side. Do this 2-3 times.



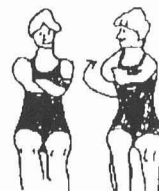
**5) Hip Flexor Stretch:** Lying on your back with legs straight, bring your right knee up to your chest, with your hands, until you feel a stretch on the front of your left hip. Hold for 30 sec. Slowly straighten your right leg. Repeat with left leg. Do this 2-3 times.



**6) Side Stretch:** In a sitting or standing position, reach your right arm up over your head and reach to the left, stretching your right side. Hold for 30 sec. Repeat on the other side. Do this 2-3 times.



**7) Trunk Rotator Stretch:** Sit with your arms crossed in front of your chest. Twist your body to the right, leading with your shoulders and not your head. Hold for 30 sec. Repeat to the left. Do this 2-3 times.



**8) Chest Stretch:** Sit with your hands on your shoulders, touch your elbows together and then apart as far as you can. Hold for 30 sec. Repeat 2-3 times.



If you use a wheelchair, plan to spend regular periods lying flat, and, if possible, standing with a frame or braces. This is an excellent way to strengthen your bones through weight bearing and stretch the muscles shortened when sitting for long periods of time.

**REMEMBER, IF YOU FEEL ANY PAIN DURING THESE STRETCHES, STOP, AND CONSULT YOUR PHYSIOTHERAPIST.**

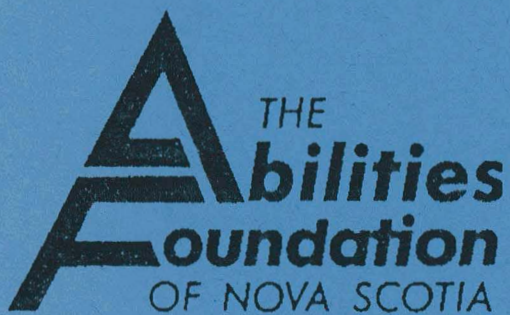


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