March 2009

POLIO POSTBOX

Editor: Ivan Jorgensen
Phone: 757-8051
ivan.jorgensen@sasktel.net
Polio Regina Incorporated
825 McDonald Street, Regina, Sask. S4N 2X5

Happy Easter

Greetings from the President

We do hope everyone has weathered this winter well. We cheated a bit by heading to the Rio Grande Valley for a month. When you come back, it feels like you were never away when the weather is like this on return. We now, finally, understand why there are people called 'SNOWBIRDS'!

Speaking of birds, we happened to end up in Saskatoon to watch the EAGLES perform and perform they did! For their age, they were marvellous!

We also made it to Manitou Spa near Watrous on the same weekend and would highly recommend it to anyone. That water beats all the pain medications on the market.

Continued on Page 2

IN THIS ISSUE

My Polio Story

This is the third in a series of our members' Polio Stories.

Verna Copeland

My life began 78 years ago on a mixed farm at Davin, Saskatchewan 25 miles southeast of Regina. I did all types of work mostly with horsepower those days. We had a pony and cart or cutter or horseback to attend the one room school (10 grades, 1 teacher). After passing my grade 10, I looked forward to registering at Balfour Technical School in Regina to take my grades 11 & 12, then go into nurses' training.

August 17, 1947 changed all that. The summer was going well and harvest had started. I was driving the tractor that pulled the binder to cut the crops. My dad rode on the binder to use the levers and drop the sheaves to be picked up later to be threshed in a machine.

It was Monday morning and I started throwing up but felt okay so kept on driving all day. The nausea stopped around 6 p.m. I didn't have much appetite so went to bed as usual. Tuesday morning I felt kind of tired and sickly so mom took me to our family doctor. He did what exams he could to see if there were any signs of Polio. I told him it felt as though something was missing in my throat. It appeared to be Strep Throat and he gave me medication.

Continued on Page 2

Greetings from the President - Continued

Our Christmas party was a great success again and that was about the last time Polio Regina met. Many thanks to Verna and Ross who do so much work to make the party a great event.

Both January and February meetings were cancelled due to inclement weather. Our next AGM meeting will be on March 26th. Hope to see you all there and hear what has been happening in your lives.

Many thanks to Ivan Jorgensen for putting this newsletter together. He is always looking for any articles you have to submit to him.

Keep smiling. Spring is coming!

Warm regards,

Carole Tiefenbach

My Polio Story- Continued

Wednesday morning I felt the same only weak from not eating. By the end of the day, I was having trouble swallowing and the muscles seemed weak in my neck.

Thursday morning I couldn't swallow the pills that were prescribed and when mom phoned the doctor he told us to go to the observation wing at the General Hospital, Regina. By this time I couldn't cough, hold my head up straight and was seeing double. A spinal tap told us it was Polio. It took 3 nurses to walk me up the stairs to the isolation wards.

The first night I started choking and the hospital phoned my parents to hurry in as I was delirious and they had trouble keeping me in bed. Mom insisted they get private duty nurses round the clock. It was hard to find nurses to care for Polio patients as they were afraid of this "terrible" disease. At that time an 8 hour shift was $8.00 so mom offered them double pay if they would only come. This meant $48.00 for 24 hrs. There was an iron lung waiting outside my door, but I didn't need it.

After 4 or 5 days my mind straightened out and it was safe to be without constant care, so the nurses were let go. I was fed with IV and chewed ice cubes when I was thirsty. I had to be careful to not let any water down my throat as I would choke, so I would have to spit out the water.

On day 12 one of the nurses tried to feed me some juice. What an experience, most of it came out my nose, but after an hour we put away 1 ounce. Every day was a little better and after 2 ½ weeks I was able to swallow some soft food.

After 3 weeks I was taken to a 4 bed ward in the main part of the hospital. I spent another 2 weeks there taking physiotherapy everyday on my neck muscles.

October 2nd was a happy day for me, after 5 weeks in hospital, I was finally going home. I continued going to the General for physiotherapy every Tuesday and Thursday. In summer I went by bus and when winter came the roads would block and I had to go by train. We would have to go by team and sleigh 3 ½ miles to Davin and meet the train at 7:30 a.m. and return at 8:30 p.m. Sometimes the train would be late and not get to Regina till noon or maybe get us back at night at midnight. Then too it could be 0 or -30.

March 15, 1948 found me back in the hospital. The roads were snow blocked so had to go by air ambulance. I had a bad chest cold and not being able to cough my lungs filled up and needed lots of sulfa drugs and penicillin every 3 hours. When it was taking too long to get better, the doctors had a meeting and decided I needed a bronchoscopic procedure. This is when they put a steel pipe down to the lungs and another glass tube inside to force some of the mucous out that is clogging the lungs. I never ever want to go through that again. After having Polio I was told to get to the doctor for antibiotics before it got so bad. After 2 years of physiotherapy I felt it was no longer helping if it ever did.

I had a mostly normal life, married and we had a mixed farm. I enjoyed all the jobs of farming and showing our registered cattle in Canada and U.S.A.

After 46 years I had to slow down as Post Polio Syndrome caused my larynx to close up. November 1993, I had to have a trache put in and now I don't fear choking any more, but my voice is weaker and I get out of breath talking. However, I had a good life and when I look around me, I see so many that are worse off than I am.

A Cruise from Feb 1 – 8, 2009

By Betty Williams

Barry and I went on cruise at the first of February.

We arranged our flights a good six weeks earlier. I did that on-line and got our tickets. I was told to phone in because of my motorized wheelchair. I did phone Air Canada but was not given any special instructions except to be there three hours early.

Then we got to thinking that maybe we should fly a day earlier in case we ran into bad weather. This was our first cruise and we learned a lot about what to do to prepare for another cruise.

I phoned Air Canada to make the changes and then I was told to phone the medic office with the weight and dimension on my chair. I did so and wondered what would have happened if we had not changed our plans.

We got to the airport three hours early. The ticket agent was glad as it gave them a chance to take care of my chair without being too busy. The baggage gentleman came and Barry went with him to show him how to take it apart and unhook the batteries.

The ticket agent got me the biggest wheelchair a person could ever want. My feet did not reach the foot rests and even if I could wheel myself I could not reach them properly. It was tough pushing for Barry as it was so big. I wondered just how fat she thought I was!

We were pre-boarded as usual. We flew to Toronto and being the last off, I sat watching out the window and to my horror; I saw them throw the seat of my chair onto a cart. So that left a little worry niggling at me.

An attendant met us with a wheelchair and took care of pushing me to the baggage area and waited with us for my chair. A half hour went by and no chair. So, the fellow took Barry with him and they went looking. Barry saw the baggage men pick up the bottom of the chair and chuck it onto a conveyor belt. We found a hole in the skin of the chair and a long scratch. Fortunately the chair worked when put together but it ran fairly noisily.

Another attendant came to guide us to the airport hotel where we planned to stay overnight. Barry put some of our luggage at an overnight depot in a store. So, we did not have a lot to carry to catch the comuter train and go to the hotel. The attendant stayed with us all the way to the door of the hotel. So, it was much easier in the morning to come back.

Barry took me to a line up for the flight to Miami and went to get our luggage. An airport officer came and told me I had to be in another line for people needing assistance. It was around a corner and down quite a bit so I wanted to wait in the area where Barry was so he could find me. But the officer insisted I had to leave.

So, I went and got in line. People bumped me as they went by and it was quite annoying. Barry got back to the area where he left me and fortunately someone waiting in line that saw it all explained to him where I was.

It took the full three hours of being there early to get through the line, then through customs and security. I was allowed to have my chair until it was time to board. Then a baggage person came and Barry showed him how to unhook the power and release the brake so they could move it.

When I booked our seats I booked the two inside seats so Barry would have the window and I would sit in the middle. The ticket agent moved our seats closer and put the third person by the window. So, I had a gentleman climbing over me four times.

We were last off as usual and an attendant was there with a wheelchair and took us to baggage. Barry got a cart this time and my chair was brought to

me without too much harm. We took a wheelchair accessible taxi to the hotel. The taxi driver had the right kind of lift but no tie downs so my chair moved every time he stopped and started.

February 1 at 9:00 we asked the hotel clerk to call for a wheelchair taxi for 11:00. The taxi came at 10:00 but the hotel clerk did not tell us and sent the taxi away and told him to come at 11:00. At 12:10 no taxi. So, the clerk and Barry decided they would lift my chair into the back of the hotel shuttle. I tried to climb into the shuttle and slid to the ground. I did not hurt myself; I really just slowly slid to the ground!

Well, the driver of the shuttle was annoyed to no end and I am sure he was worried I would sue them. We got a ride to the airport where the shuttle was for the ship.

Once we were at the ship we were fast forwarded all through every line and did not have to wait for anything. Our cabin was just huge. It had a wheelchair accessible bathroom with a bench in the shower and floor drains all around the shower.

The room was spacious with dresser and desk like where I could sit up to put on make up, etc. Two big windows and twin beds. Emergency bell pull in the bathroom and one by the head of the bed. At the door all we had to do was put the key in and the door opened by itself and closed by itself.

I got to 11 of the decks and could not go up on the twelfth part and I could not go in the theatre on the top level. I also could not use the hot tub or pool as there were steps to go up to them.

The food was fantastic and the entertainment was the best. Every evening there was the Las Vegas type show or jugglers and magic show, comedians and lots of music. During the day there were trivia games, bingo and activities for children and teens. Carnival is a party cruise but it is family oriented up to midnight and we were in bed by midnight anyway.

We did not get off in Puerto Rico as it was in the evening and we were told the streets were cobble stones. I just figured I would find myself getting stuck.

We went on a tour in St. Thomas which was just excellent. The tour bus driver had a lift for a wheelchair and the proper tie downs so good that on hair pin turns; my chair did not move at all. The driver got me out of the bus about four times to see the sites; everywhere he took us I was able to get around and we did a little shopping. That tour cost us $35 each and was well worth every penny.

In St. Marrtens we got off the ship but stayed in the area shopping and looking around.

Coming home we were to Miami airport the three hours early but the airport for Air Canada did not open for ¾ of an hour. We had a lot fun just visiting with other people.

Again, I was allowed to have my chair until we boarded the plane. Once in Toronto we just had a few hours wait and the baggage person took my chair and did not have to take it apart.

We arrived in a fog and there was concern we would not be able to land. There had been another plane going back and forth to Calgary trying to land all day. But we were able to land and the airport staff was not ready as they did not expect us to land. We had to wait for a gate. Then we waited to be last off and finally the flight attendant said we could come out.

I cannot walk well after sitting on plane for several hours. Barry helped me walk to the outside and no wheelchair. The airport staff girl asked me to walk the bridge. I looked at her as if she was missing something and told her I would never make it. That I was supposed to be met with a wheelchair and some help. She left us standing there for ten minutes before she got back.

So, my chair required some fixing and a new skin. Peter at Automobility Medical said he would send the bill to Air Canada. So, I quickly wrote a letter of my concerns over the treatment of my chair and be asked to walk the bridge when someone knew I was on that plane and knew I was to be met. Peter told me to send a copy to Transport Canada as well, so I did.

I had to fax the baggage claims and a copy of our flight information ten days ago and have heard nothing since.

We are planning to go on another cruise next year but we may either travel another way or invite family to

come and help Barry with the luggage and getting around. All in all it was a wonderful cruise and I know if you wanted to go it would be worth it for you.

A Big Step For Us

By Blenda Ramsay

In the beginning, it was like pulling hen's teeth. It meant walking into a new era – an unfamiliar territory which shook us into reality. Both of us were experiencing health problems, so we started planning the next phase of our lives.

We spoke to Murray & Gen Grant after their move to a condo. Almost overnight they had re-established themselves in a completely new environment and we thought if it was good for them, this might be good for us too. It was a case of "keeping up with the Grant's"!

SOOOOO – the search was on to find us a new home. We would need a place that would serve the needs of both of us. Throughout the summer, Senior Homes were checked out but there were no vacancies. We had to leave our names and a deposit to be on their waiting lists. Then the wait began.

In the meantime, we started to down size our personal belongings. After living in our home for 47 years, there was a lot of down sizing to take place. We thank our family, friends and neighbors who came to our rescue and helped.

It was six months before we got a call saying a vacancy had become available. Then we had to get busy and sell the house before we could move. The house went on the market on Halloween night, 2008 and things were slow over Christmas. But then on January 9, 2009, we sold the house! It was a heart wrenching experience!

We are now living in Broadway Terrace, a wonderful facility for seniors. We are meeting new friends everyday. The staff is great! It's like living in a Hotel. We have many amenities such as weekly house keeping, daily activities, we can attend weekly church services and we enjoy 15 suppers a month.

We are moved in, but not completely settled. So far we've only had one mishap and that's when we dropped a can of Pepsi which fell to the floor and exploded. What a mess! What should we do? At that moment there was a cleaning lady on our floor, so within minutes she came and cleaned it all up. She was not perturbed, but chalked it up as an accident.

The irony was that she had been here just hours before and had cleaned our suite. We were greatly impressed by her willingness to help.

To make a long story short, if you plan a move in the future, start down sizing now! We are of the generation that saves stuff. Now we feel that "less is more" and we are happy to have gotten rid of a lot of useless stuff. You are invited to pop in for coffee anytime.

This is weird, but interesting!

fi yuo cna raed tihs, yuo hvae a sgtrane mnid too

Cna yuo raed tihs? Olny 55 plepoe out of 100 can.

i cdnuolt blveiee taht I cluod aulaclty uesdnatnrd waht I was rdanieg. The phaonmneal pweor of the hmuan mnid, aoccdrnig to a rscheearch at Cmabrigde Uinervtisy, it dseno't mtaetr in waht oerdr the ltteres in a wrod are, the olny iproamtnt tihng is taht the frsit and lsat ltteer be in the rghit pclae. The rset can be a taotl mses and you can sitll raed it whotuit a pboerlm. Tihs is bcuseae the huamn mnid deos not raed ervey lteter by istlef, but the wrod as a wlohe. Azanmig huh? yaeh and I awlyas tghuhot slpeling was ipmorantt!

The following article is about "Exercise and the Polio Survivor" which can be a controversial subject but I think it is well worth the time and effort to read it. The article is long so I will be printing it in two instalments. This article was originally printed in the San Francisco Bay Area Polio Survivors Newsletter, Volume 19, Issues 2 and 3 October and November. Permission to reprint has been granted by Phyllis Hartke, SFBAPS past President (1998-2005) and current member of SFBAPS Board of Directors.

Ms. Harthe also informed me that she just granted permission for reprint to Dr. Mary Ann Keenan who is with the University of Pennsylvania at Philadelphia (Chief, Neuro-Orthopaedics Program, Professor and Vice Chair for Graduate Medical Education Department of Orthopaedic Surgery) who will be including this article as part of the information patient packet distributed to their patients. Dr. Keenan is well respected in the polio community and has spoken at PHI conferences.

Part One

EXERCISE
AND THE POLIO SURVIVOR

Carol Vandenakker, MD
UC Davis Dept. of PM&R,
Residency Director

San Francisco Bay Area Polio Survivors
Sept 20, 2008 Presentation

Transcribed and edited by Phyllis Hartke, reviewed and approved by Dr. Vandenakker.

Dangers of Exercise (Mistaken beliefs)

- **"Use it and lose it"**
- **"Muscle strengthening exercise adds to overuse. Pumping iron and "feeling the burn" means that polio-damaged neurons are burning out. Polio survivors typically can't do strenuous exercise to condition their hearts."**

These commonly-held beliefs are erroneous. The belief that exercise causes harm to you, a polio survivor, is actually only true in certain circumstances and certainly is not true across the board or for all your muscles in your body. There are over 600 muscles in your body. They are not all equally affected by the polio, so they have different needs. We are going to talk about what those are and how you can sort out your needs.

Dangers of Inactivity

- **Deconditioning can result from limited activity as well as immobility**
- **Muscle atrophy most pronounced in anti-gravity or postural muscles, lower limbs more than upper limbs**
- **During strict bed rest, muscles lose 10% to 15% of their original strength per week and 35%-50% over 5 weeks**
- **Connective tissue contractures**
- **Ostopenia**

There is probably more danger in not being active than there is in doing exercise. That goes for everybody, polio survivor or not.

"Deconditioning" is what we call the space somebody is in if they have not been exercising. It can come from total immobility such as being in bed with an illness or just from reduced activity.

The first thing we see with immobility or severe restriction of activity is muscle atrophy in the anti-gravity or postural muscles. These start to lose strength quite quickly. Lower extremities lose strength faster than upper extremities. In large part that is because for day-to-day activities (feeding, brushing your hair, and so on) you are using only your arms. You are not moving around physically, so your legs aren't doing much of anything, so they lose strength.

When somebody is on strict bed rest, the muscles will lose 10-15% of their original strength per week. If you are in the hospital or in bed for 5 weeks, you are going to lose up to 50% of your muscle strength.

Rule of thumb is that to regain that strength once you start to be active again it takes twice as long as it took to lose it. Our experience tells us that for a polio survivor whose muscles aren't as innervated as a normal muscle, it can take up to four times as long to regain that strength.

You can certainly see why having a significant illness or injury that puts you in the hospital or puts you in bed for a certain period of time can really impact your strength and your function, and why those episodes

are often associated with the onset of post-polio syndrome or realizing your polio muscles are weaker. You have that added effect of deconditioning.

With deconditioning or inactivity you can also start to get contractures of soft tissue and your bones lose density.

All these detrimental effects of inactivity are the reverse of the benefits of exercise; exercise does the opposite of what inactivity does.

Health Benefits of Exercise

- **Cardiovascular disease: inactivity is a major risk factor for development of disease**
- **Secondary prevention: reduced mortality with cardiac rehabilitation**
- **Decreased blood pressure**
- **Lowered triglycerides; increased HDL "good" cholesterol**
- **Reduced risk of blood clots**
- **Inverse relationship between obesity and activity**
- **Diabetes: reduced progression from glucose intolerance to diabetes; increased insulin sensitivity**
- **Maintenance of bone density**
- **Improved sleep quality**
- **Improved quality of life and sense of well-being**

Exercise helps to maintain and strengthen the cardiovascular system. Studies show that for a person who is inactive, there's a major risk factor for development of cardiovascular disease and a significant risk of a second demand or increased mortality. Exercise will reduce that mortality risk. That's why rehabilitation has become a mainstay of treatment after heart attacks and cardiac events.

Exercise also helps to lower blood pressure. It lowers the triglycerides (the "bad" cholesterol in your system) and increases the HDL "good" cholesterol. It reduces the risk of blood clots which is a major cause of strokes.

There is an inverse relationship between obesity and activity. When you become inactive I am sure have noticed that it becomes harder to maintain your normal weight.

The risk of developing late onset diabetes is significantly decreased if you are active. The progression from glucose intolerance or having some degree of high blood sugars to going into full-blown diabetes is significantly impacted by activity.

Bone density is maintained by activity.

Sleep quality is affected by activity. Your normal body cycle needs some activity and cycling during the day so that it is ready to rest at night. Otherwise, your body gets all confused and doesn't know when it is supposed to be resting or sleeping.

Overall, activity or exercise can give you an increased sense of well-being. That being said, how much activity do you need?

How Much Exercise?

- **Individual need: risks and benefits**
- **Medical evaluation**
- **Goal: 30 minutes/ day**
- **Activity vs. Exercise**
- **Benefits are dose-related**
- **Long term compliance**
- **Lifestyle balance**

That's very much an individual thing, especially for a polio survivor. Everybody really needs to evaluate their own risk and possible benefits from an exercise program. For anybody who has not been exercising and is over 35, you should have a medical evaluation before you start an exercise program to make sure there isn't cardiac disease or lung disease that may impact your ability to exercise. If you have significantly weak muscles from polio, you may need additional evaluation with a therapist or rehabilitation physician who can guide you with an exercise program, but we'll get more into that later.

The optimal goal for exercise is at least 30 minutes per exercise session, but there's specific ways to accomplishing that. That 30 minutes of exercise could be 10 minutes, 10 minutes, 10 minutes, spread out throughout the day. It doesn't have to be all at once. For polio survivors, that's a very good thing

because often 30 minutes of continuous exercise is too much.

What we think of as exercise may be too much to start out. A lot of studies in the cardiac literature reviewing cardiac risk factors look at increasing activity rather than exercise per se. People think of exercise as "Oh, I don't want to exercise, or get all sweaty, or out of breath." Just increasing activity has benefits. Doing more activity with your body that you are able to do (such as very low intensity moving limbs or walking around) does provide a benefit to your body.

The benefits are dose-related. The more you can do, the more benefit there is to the cardiovascular system. Everybody has an optimal amount that is good for them without putting them in danger of having other secondary problems.

The downside of exercise, though, is that the benefits are not permanent if you stop exercising. You can't exercise for a few months, gain the benefits, and keep them for life. You have to keep working at it. That's the hard part. Some of you are really good at being consistent with something. Others like to meet a goal and then when done with it move on to the next project. It's the long-term compliance that benefits you the most. Doing the little bit of exercise that you can tolerate, that you don't mind or that you actually enjoy, and keeping up with it is a whole lot better than going all out for a few months and then stopping and not doing anything for the next few years. A little bit over time is a lot more beneficial than a lot for a short period of time.

It's more about what works in your lifestyle. You all know about adapting lifestyle and working out changes in your activity patterns by having to do more pacing and resting and maybe change how you are doing things. Well, exercise is the same of idea. To get the optimal benefits, you have to figure out where you can fit it in your life and what works the best for you.

Exercise Components

- **Aerobic Conditioning**
- **Strengthening**
- **Flexibility**
- **Coordination**

The components to a basic exercise program are mainly three things: aerobic conditioning, strengthening exercise, and flexibility. I have also listed a fourth element that we will discuss later, coordination and balance. We will first focus on the big three.

Aerobic Conditioning

- **Low intensity, long duration activity**
- **Increased energy demand can be met by aerobic metabolism**
- **Oxygen is required for metabolism of carbohydrates and fat**
- **Rate of energy production slow, but total production virtually unlimited**
- **No fatiguing or painful by-products produced**

Of the three main components, aerobic conditioning is the most important to your over-all cardiovascular health and your risk of death. Are you going to have a heart attack? Are you going to have a stroke? Aerobic conditioning is where you gain all those preventive benefits.

Aerobic conditioning is a low intensity activity that you can maintain for an extended period of time because the energy demand of the activity can be produced by your body while you are doing the activity. You are able to take in enough oxygen to use for what is called oxidative metabolism, to produce the energy source for your muscles and heart. While you are doing the activity, your body is keeping up with the energy demands so you don't go into an energy deficit or oxygen debt.

When you do a fast, high intensity activity your body goes into oxygen debt and you have to make it up afterwards. Think about walking, if you are going at a comfortable pace from a heart and lung perspective you can keep that up for a long period of time as opposed to sprinting which you can't do for very long. That is because you are accumulating oxygen debt and your body cannot keep up that metabolism.

So during aerobic conditioning your body is providing the energy as you are doing it. The rate of energy production is slower in these oxidative cycles but virtually unlimited.

There are not a lot of painful byproducts of metabolism, like lactic acid production, when you are doing aerobic activity.

Oxygen Uptake

- **Oxygen uptake (VO_2) measures rate of oxygen utilization for production of energy**
- **Measured as liters/min or liters/kilogram/ minute**
- **Metabolic equivalent (MET) equals 3.5 ml/kg /min which is approximately resting state**
- **VO_2 max is a measure of work capacity and cardiorespiratory fitness**

Oxygen uptake, the amount of oxygen your body can utilize per minute for activity, is known as your VO_2 rate. Everyone has a maximum rate. For somebody who does not have a lot of muscle mass, who's not very active, the maximum ability to utilize oxygen is low compared to an athlete who is highly trained. Elite athletes are genetically programmed so their blood can carry more oxygen, their heart can circulate the blood and the muscles can extract the oxygen. Your VO_2 maximum can be changed by conditioning exercise. We are going to talk about how you can do that and how that affects your day-to-day life.

A "MET" (anybody who has been through cardiac rehab probably knows this term) is a metabolic equivalent. It is essentially the oxygen cost of sitting at rest. One MET would be the energy you burn just sitting there. Different activities are measured by how many METS they require.

Physiological Adaptations to Aerobic Exercise

- **Heart**
  - Increased cardiac output
  - Increased stroke volume
  - Increased blood volume
- **Muscle**
  - Increased oxygen extraction in muscle
  - Increased capillary density
  - Increased capillary-muscle fiber ratio
  - Increased number and size of mitochondria per muscle cell

Cardiac rehab is based on what your heart can tolerate as far as metabolic equivalents and tells you what activities are safe to do from a cardiovascular perspective. As you start an aerobic exercise program, increasing your cardiac demand, your heart adapts by increasing the amount of blood it is pumping out. It does that by increasing the amount pumped with each contraction. The heart muscle actually gets stronger. You are able to actually send more blood out with each heartbeat to your muscles. In addition, your body produces more blood volume. There is more volume for the heart to pump, so the heart becomes more efficient without having to increase heart rate.

The muscle adapts to exercise by being able to take more oxygen out of the blood that is coming through. As the blood is coming through the muscle (oxygen and carbon dioxide exchange there), your muscle is taking more oxygen out. The muscle becomes more efficient at the process as you exercise and train the muscle.

In addition, more capillaries form. Those are the little blood vessels between the arteries and the veins. You develop more of those in the muscle tissue, more efficiently delivering the oxygen to the muscle. So you have more capillaries per muscle fiber. Even if you have a limited amount of muscle fiber, you have more blood flow going to those muscle cells so those muscles can work more effectively.

Also within the muscle fiber, the muscle cell itself develops increased number of mitochondria. They are the energy producers within the cell that use oxygen to produce energy.

Physiologic Changes due to Aerobic Exercise

	Rest	Submax Ex	Max Ex
Heart Rate	↓	↓	↓
Stroke Volume	↑	↑	↑
Cardiac Output	↔	↔	↑
Myocardial O_2 demand	↓	↓	↔
Ventilation	↔	↓	↑
Arteriovenous O_2 difference	↔	↑	↑
Blood lactate concentration	↔	↓	↑
Muscle blood flow	↔	↓	↑
Blood pressure	↓	↓	↔

Exercise makes everything more efficient. If you look at this table, one of the things you may notice is that it affects not just your capability to do exercise and enable you to do more activity, but it also makes sub-maximal activity more efficient so you don't have to work as hard to do the activity. Day-to-day activities, taking a shower, walking around the house, are easier to do because your body is more efficient.

I want to point out that heart rate does not go up at all. Your heart just becomes more efficient. It is the stroke volume that goes up. So if your heart is stronger, pumping more blood with each beat, then at rest your pulse or heart rate actually becomes slower. When the metabolic demand is the same, your heart does not have to beat as frequently to deliver the same amount of blood to the body. Many trained athletes have very low resting heart rates because their hearts are so efficient. The cardiac output for rest or sub-maximal exercise remains the same. But the maximum exercise you are able to perform increases as the heart is able to deliver more blood to the body.

The myocardial oxygen demand, or the demand for oxygen in the muscle of the heart itself, is reduced at rest and sub-maximal exercise. Again, the heart muscle is more efficient. At maximum, it is the same.

Your ventilation is also more efficient during sub-maximal exercise. You do not have to breathe as hard. Using myself as an example, if I climb a few flights of stairs briskly, I'll be out of breath at the top. If I did it regularly, I would get to the point that I could do it without being short of breath with my heart pounding.

Blood lactate concentration involves lactic acid, a byproduct of anaerobic metabolism. When you are not meeting the energy demands with oxidative metabolism your body uses anaerobic metabolism and you produce lactic acid as a byproduct. Lactic acid is part of what makes your muscle sore after an activity. The production is decreased with sub-maximal activity or if you are able to meet the energy demand of an activity with aerobic metabolism. That is because your muscle is more efficiently using oxygen.

Blood pressure at rest and during sub-maximal exercise will be decreased. You can see that your heart rate will be lower, your blood pressure will be lower, your heart is more efficient, and your muscles are more efficient as a result of an exercise program.

Results of Aerobic Conditioning

- **Ability to do more activity**
- **Increased MET tolerance**
- **Energy efficiency improved**
- **Everyday tasks are easier to do**
- **Most polio survivors need some aerobic conditioning**

A lot of good things happen when you do aerobic conditioning. In addition to being able to do more or tolerate a greater level of MET activity, everyday tasks are a lot easier to do. For example, it's not such a tremendous amount of work to get up and get dressed and get that shower done.

MET Equivalents

1.5 – 2 METS	Seated ADLs (eating, hygiene) Seated recreation/work (writing, typing)
2 – 3 METS	Standing ADLs (showering, dressing) Slow walking, standing recreation
4 – 5 METS	Heavy housework, brisk walking Golfing, canoeing, badminton
6 – 7 METS	Heavy gardening, climbing stairs, speed walking
8 – 9 METS	Heavy labor, jogging 5-6 mph

Now let's take a look at the metabolic equivalent table. One MET is sitting at rest. One and a half to two METS is doing things like eating, hygiene, maybe sitting at a desk and writing. If you are showering or dressing, you are up to two or three METS. Once you start brisk walking or housework you are up to four or five. You can see it takes almost twice as much energy to shower as to get out of bed and sit. To do things that require more energy, you want your body to be more efficient providing that energy.

Basics of Aerobic Conditioning

- **Submaximal intensity**
- **Repetitive activity**
- **Exercise mode should incorporate a large muscle mass**
- **Perceived Exertion of "fairly light" to "hard"**
- **Duration of at least 20 minutes**
- **Exercise frequency at least 3 times/week**

Aerobic conditioning should be a sub-maximal activity that you are doing on a repetitive basis. To be most effective, the exercise mode should incorporate as large a muscle mass as possible. That pretty much means using your good muscles, and not the weak ones, and we'll get into how to determine that. The more muscle mass you can incorporate the more you are going to benefit from the exercise.

Your perceived exertion, or the way it feels to you, should be somewhere between "fairly light" to "hard". For polio survivors I would recommend "fairly light" to "moderate". Don't try to exercise at a hard level. The duration should total at least 20 minutes. Again, you can divide that up if you need to, or you can do it in intervals with rests in between. For the greatest benefit the frequency should be at least three times a week. For polio survivors twice a week may be optimal to give more recovery time in between sessions.

Additional Guidelines for Polio Survivors

- **Strongest muscle groups should be used for repetitive aerobic exercise**
- **Exercise should not increase stress on weak muscles or overstressed or unstable joints**
- **Consider non-weight bearing mode of exercise**
- **May need to start well below suggested intensity, time and frequency to keep exercise at sub-maximal level**
- **Use of rest intervals may be essential**
- **Always monitor for overuse**

Polio survivors must keep in mind that the strongest muscle groups should be used for repetitive aerobic activity. The exercise should not increase stress on weak muscles or on overstressed or unstable joints. The means of exercise should not be putting undue stress on a joint that is already showing wear and tear, pain or other problems.

For that reason, non-weight-bearing exercise is more ideal than walking or jogging. In the pool, the water eliminates the weight-bearing component. On some of the exercise machines you can exercise in a seated position.

Polio survivors should start well below the suggested intensity and frequency. Start with next to nothing. The mistake many people make when starting an exercise program is going gung ho and trying to do too much too fast or trying to keep up with friends. Don't compare yourself to others". Even if you are exercising for only two minutes initially, that's OK, it's a start.

We are trying to work toward lifetime gains and keep the exercise in a safe zone where you are not doing damage. So, start with what you think is nothing, and gradually build on that. As long as you build very slowly and carefully, you can build and you can progress.

The use of the intervals or rest periods interspersed may be essential to getting started. Always monitor for overuse signs in muscles.

Strengthening Exercise

- **Muscles, ligaments, tendons, connective tissue and bones respond to physiologic stress or near maximum loads**
- **Structural changes occur that increase the strength of the tissues**
- **Exercise must stress tissues without over-stressing**
- **Overwork may result in injury**

With strengthening exercise the focus is different. The focus is not to condition the cardiovascular system but to strengthen specific muscles or muscle groups.

Strengthening exercise incorporates stress put on muscles, ligaments, tendons, connective tissue. When you stress a muscle to near maximum; the muscle

will respond physiologically by building stronger, more organized tissue.

Structurally the muscle and connective tissue become stronger. The key is to stress these tissues without overstressing. If you overstress you can strain, you can tear, and you can cause all kinds of new problems. It may be difficult but it is possible, even for a polio survivor, to start a good strengthening program without doing damage.

Adaptations to Strengthening Exercise

- **Adaptations occur in both muscle and central nervous system**
- **Increased number of motor units activated**
- **Increased rate of activation**
- **Improved synchronization of motor units**
- **Increased size of muscle fibers by increased protein and number of myofibrils**

The adaptations to strengthening occur primarily in the muscle but also in the central nervous system. In the muscle, fibers will enlarge by adding more protein into them and the connective tissue will strengthen. Your nervous system responds by improving synchronization so that the muscle fibers or motor units in the muscle become more efficient in contracting together, activating at the same time and activating sooner. You are able to utilize the strength that you have more effectively.

Adaptations to Strength Training

- **Increased number of capillaries**
- **Increased thickness and strength of ligaments and connective tissue**
- **Increased bone density**
- **Increased cartilage thickness**

With strength training you also get increased number of capillaries, more blood flow to the muscle. You are stressing the bone which responds like muscle and gets stronger. Cartilage thickness and strength also increase.

Basics of Strengthening Exercise

- **Progressive Resistance Exercise**
- **Exercises done in sets of repetitions with rest period between sets**
- **Intensity determined by maximum strength**
- **Volume of exercise gradually increased**
- **Program must be individualized**
- **Response can vary based on genetics, number of muscle fibers**
- **Use of personal trainer can lead to more optimal gains**

The basic principle of strengthening is progressive resistance, meaning you are start with whatever level your muscles can tolerate and work up. You can do it without damaging muscles and slowly increase the resistance or stress on the muscle. As the perceived work lessens, or the activity gets easier, you increase the resistance and stress the muscle a little more. You can slowly work up until you reach your goal, or are unable to increase further.

There is a maximum you can reach. This is determined not just by polio but by genetics. Each individual has a limit to how much strength they can achieve. Certain people can strengthen their muscles to a phenomenal amount of strength. Other people cannot. You can often estimate somebody's capability of building muscle by their body type.

To start an appropriate strengthening program, you may need individual help. It is very easy to do exercise incorrectly, to stress areas you shouldn't be, and cause injury or damage. Using a personal trainer or a therapist to instruct you and ensure that you do it correctly, I think, is really a key in benefiting from strengthening exercises.

Considerations for Strengthening Programs

- **Which muscles need to be trained?**
  - Functionally important
- **What type of muscle action (isometric, eccentric)?**
  - Isokinetic: strengthening through range of motion
  - Isometric: strengthening without movement
  - Eccentric: strengthening while muscle lengthening

- **Prior injuries, weak areas, at risk areas?**

When you are starting a strengthening program you have to think about which muscles you going to work on strengthening. If you are a bodybuilder, you work on all your muscles. Probably none of you have that goal at this point. So what you need to think about is "OK, where am I having problems functionally? What added strength will help me?" You may need help identifying which muscles can improve function. Can the muscle actually be strengthened? Or is it a polio-affected muscle that isn't going to get stronger, so a new compensation is needed.

There are many muscles which you can strengthen. If you are developing a problem in one part of a certain limb, and you have to decrease activity because of the problem area, at the same time, you are using the "good muscles" less. So the "good muscles" lose strength because you have decreased or avoided activities they previously performed. This can get complicated, so consulting with a professional is helpful in sorting the problem out. "OK, I can't walk as much because one leg is weak and showing signs of overuse, so how do I keep the other leg strong?"

There are different ways to strengthen muscles with various types of movement. In general we think of isokinetic strengthening exercises, working a muscle through its range of motion. This strengthens throughout the entire range of motion of the muscle. Sometimes this exercise cannot be done either because a joint is unstable or painful, or something prohibits going through the range of motion. Motion may be aggravating symptoms, making a problem worse.

In those situations, you can strengthen muscles by doing isometric contraction. You contract muscles on both sides of the joint without movement. You keep the muscle at the same length in any position and increase the tension in the muscle.

Eccentric strengthening uses contracting the muscle while it is lengthening. As a muscle contracts, it shortens. For example- my biceps muscle, when I am picking something up, I am activating that muscle and the muscle shortens. Now, the opposite of that action is extension, right? Well, I can extend without using the muscle, just gravity. But if I am resisting gravity to control the speed of the motion, I am contracting the muscle while the muscle is getting longer. That's called an eccentric contraction. You'll strengthen faster doing those sorts of contractions. But, you are also at higher risk of causing injury, producing some damage in the muscle and soreness in the muscle afterwards. For some of you, eccentric contractions in strengthening might be helpful. Others may want to stay away from them completely.

In the pool you don't have to do eccentric contractions. It's almost all concentric; the opposite. That's one of the reasons you are safer in the pool. And once again, we want to be aware of the any at-risk areas.

Components of Strength Training

- **Number of sets**
  - Initially single-set can be effective
  - Long-term multiple-sets are more productive
- **Rest period between sets**
- **Intensity or amount of resistance**
  - Based on desired number of reps
  - Lower reps increase strength
  - More reps increase endurance
- **Repetition Speed**
  - Higher speed improves power
- **Rest periods between workouts**
  - Heavy loads and eccentric training require longer rest periods
  - Progression of frequency
  - Split programs

When you are setting up a strength training program, it starts with repetitions and sets. "Repetitions" means how many times you repeat the activity and "sets" are how many times you repeat the group of repetitions after a rest period. If you are serious about this, you change the intensity or amount you are lifting during the different sets.

A low number of repetitions at high intensity increase strength. More repetitions at low intensity increase endurance. So if I said "I am going to build up this biceps muscle. I want it really big and really strong,"

I would start with the amount of weight that I could lift perhaps five times and that's it. I would start very close to my maximum weight and do a low number of repetitions. If I want this muscle to be able to work all day, I would use a lower percent of my maximum and do more reps, perhaps 10 or 20 reps.

Start at a close-to-maximum level and as it gets easier (which it does because your body is adapting), increase the resistance. So with either method you will get stronger muscles, just different kinds –bigger muscles if you are doing less reps, more endurance if you are doing more reps.

With strength training it is important to have rest periods in between. For some polio survivors that might mean three or four reps before resting. All of this is individualized and tailored to you.

If you want to have power, which is explosive strength, you would work on speed and strength at the same time. You folks probably don't need a lot of power, right? (Laughter) You don't need power to do day-to-day activities.

Do schedule rest days between work-outs, don't do workouts every day. People often split programs. A body builder might work on strength training daily, not on the same muscles every day but alternating upper extremities and lower extremities. The muscles need a rest period to recuperate, to rebuild tissues, for the body to make the adjustments. For polio muscles, the recuperation can take more than a day in between. If you start a strengthening program, you should start with two to three days in between.

More Guidelines for Polio Survivors

- **Set specific goals for functional gains**
- **Don't strengthen just because a muscle is weak**
- **Be aware of at-risk muscles and at-risk joints**
- **If body mechanics or joint positions are altered, use isometric strengthening**
- **Polio affected muscles will require longer rest periods to recover between sessions**

If you are thinking of strengthening, do it with help and set specific goals. Have a goal in mind, a reason you are strengthening, not just "oh, this is a weak muscle; I have to strengthen it." You can spend a lot of time and energy on something that may not benefit you. Most of you have a limited amount of energy so use it where it is most effective.

One example of a functional goal is rising from a seated position. Often, getting up out of a chair is becoming harder to do. The primary muscles that help you get up out of a chair are your quads and your glutei muscles. If you do not have significant polio involvement in those muscles, you would strengthen those particular muscles.

Be mindful of joint position and body mechanics. Not everybody can do strengthening exercises correctly. Stressing a joint that is not aligned correctly may cause problems. After polio, joint alignment or limb alignment is changed because of the muscle imbalance. You have to be very careful on how you work on strengthening the muscles in an affected limb.

Continued in next issue

Actual writings from Hospital charts:

1. The patient refused autopsy.
2. The patient has no previous history of suicides.
3. Patient has left white blood cells at another hospital.
4. She has no rigors or shaking chills, but her husband states she was very hot in bed last night.
5. Patient has chest pain if she lies on her left side for over a year.
6. On the second day the knee was better, and on the third day it disappeared.
7. The patient is tearful and crying constantly. She also appears to be depressed.
8. The patient has been depressed since she began seeing me in 1993.
9. Discharge status: Alive but without my permission.
10. Healthy appearing decrepit 69-year old male, mentally alert but forgetful.

Where to meet

Our Polio Regina group meets at 7:00 p.m. on the last Thursday of the month at Room H203 at the Wascana Rehabilitation Centre, 2180 - 23rd Avenue, Regina, SK. Enter the main doors of the Wascana Rehabilitation Centre and turn left and take the elevator that is across from the information desk. Push button "2" (not 2R) on the elevator. When you leave the elevator turn left and go past the information desk, through a recreation area, past the pool table to room H203 which is the first meeting room. Our group should be in there. There are no meetings in July, August or December. Call 543-6380 to confirm that the meeting will be held.

Web Site:

Check out our website for more information on Polio Regina and links to other useful related information at: http://nonprofits.accesscomm.ca/polio/
or you can just Google Polio Regina. Our email address is: polio@accesscomm.ca

---

MEMBERSHIP APPLICATION POLIO REGINA Inc.

Name _____

Active ( ) if you had polio Associate ( ) New ( ) Renewal ( )

Address _____

_____

_____

Postal Code _____ Phone: _____

Annual membership fee: (Jan.- Dec.)
$10 Single; $15 family $_____
My donation to Polio Regina Inc.:* $_____
Total $_____
(If you require sponsorship for your fee, inform our membership chairman)

Please make cheque payable to: **Polio Regina Inc.** and mail this application form and cheque to:
Polio Regina Inc., 825 McDonald St. Regina, Sk. S4N 2X5
(Official receipt of donation for income tax purposes will be mailed.)

Christmas Party 2008

The Polio Regina Annual Christmas Party was held December 6, 2008 at Westminster United Church. We were treated to a delicious turkey dinner with all the trimmings.

After the dinner Carole and Wilf Tiefenbach were presented with a Life Membership to Polio Regina to acknowledge their work and dedication to Polio Regina over the years. Carole is president and Wilf is vice-president of Polio Regina. Blenda Ramsay made the presentation.

Entertainment was provided by the band ***Crossover*** who played a variety of old favourites and Christmas music. A number of door prizes were awarded. It was a great opportunity for our members and guests to enjoy a good meal, renew acquaintances, enjoy the entertainment and exchange Christmas greetings. Polio Regina owes a debt of gratitude to Verna Copeland for her hard work in making all the arrangements and organizing the Christmas party.

Raffle and door prize winners, Carol and Noella

Doc the ladies man

Adam and Mavis with her origami

Murray and Gen