

Hepatitis C: Occult Infection



Liz Highleyman

There remains much we don't know about chronic hepatitis C. One such mystery is occult HCV. Usually the virus betrays itself by the presence of antibodies or viral genetic material (RNA) in the blood serum or plasma (the clear, fluid portion of whole blood). But some people who have no detectable HCV antibodies and no evidence of HCV in their serum nevertheless harbor hidden virus elsewhere in their bodies. (HCV is not the only virus that can take an occult form; HIV, for example, can hide in "reservoir" sites such as the brain and lymph nodes even if blood viral load is undetectable.)

Occult HCV may be suspected if a person has persistently elevated liver enzyme levels or extrahepatic (outside the liver) conditions commonly associated with hepatitis C. About one-third of people with chronic HCV have persistently normal levels of one such enzyme, alanine aminotransferase (ALT). Although many people with normal ALT do not progress to serious liver disease, some do develop fibrosis. A recent large study showed that patients with normal ALT can benefit from therapy with pegylated interferon plus ribavirin, suggesting that HCV-infected people with normal ALT should be treated based on the same guidelines as those with elevated ALT.

Unfortunately, an estimated 10% of people with persistently abnormal liver enzymes have no readily identifiable cause of liver damage using standard tests. There is concern that such patients may be missed and therefore not offered therapy due to false negative antibody or serum viral load tests. While occult HCV appears to be relatively mild in comparison with its more obvious counterpart, some patients with hidden virus may still progress to serious liver injury. Another concern is that HCV in donated blood and tissue may elude current screening tests.

At the annual meeting of the American Association for the Study of Liver Diseases this past October, and again in the January 1, 2004 issue of the *Journal of Infectious Diseases*, researchers reported that patients with persistently elevated liver enzymes may harbor HCV even if they have no serological evidence of the virus. Immaculada Castillo and colleagues from Madrid studied 100 patients who had abnormally high ALT, aspartate aminotransferase (AST), or gamma glutamyl transpeptidase (GGT) levels for at least 12 months. All readily apparent causes of liver disease were ruled out. The group had no evidence of HCV antibodies or serum HCV RNA (using a viral load test with a limit of detec-



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tion of 10 IU/mL). Thirty patients with liver damage due to non-viral causes were studied as controls.

The researchers used two different types of test to detect occult HCV. First, they analyzed the presence of HCV RNA in liver biopsy samples using the reverse transcription-polymerase chain reaction (PCR) assay, the most commonly used viral load test. Using a PCR test that identifies the 5' NC region of the HCV genome, they found evidence of HCV genetic material in the liver samples of more than half (57%) of the 100 patients with unexplained elevated liver enzymes, but in none of the samples from the controls. Using a PCR test that detects the core region of the HCV genome, they detected RNA in 70% of the samples from the 57 patients previously found to have occult virus.

Second, using a test called in situ hybridization, the researchers found positive-strand HCV RNA in the liver

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A Brief History of Hepatitis C



Alan Franciscus, Editor-in-Chief

The management and care of hepatitis C has come a long way in the last decade. While there are still many unanswered questions, we have a much better understanding of hepatitis C transmission, prevention, disease progression and treatment. This article will focus on a brief review of the history of hepatitis C and the major strides made in treating HCV since the identification of the virus.

PRIOR TO 1990

It is impossible to really know the origins of hepatitis C since there are no stored blood samples to test for the virus that are older than 50 years. However, given the nature of the evolution of all viruses, hepatitis C has probably been around for hundreds of thousands of years or more before evolving into the current strains.

Some experts speculate that since HGV/GBV-C, a close relative of HCV, originated in Old and New World primates, the beginnings of HCV might be traced back to 35 million years ago. However, this is just speculation and it is impossible to corroborate these theories at the present time. On firmer ground is the prediction that the different subtypes of HCV originated approximately 200 years ago and that the six main genotypes of HCV most likely had a common ancestor approximately 400 years ago. However, it has also been pointed out that it is difficult to limit the origin of HCV to such a short period of human history because the

virus is found in remote areas all over the world. As well, the virus is mainly spread by direct blood to blood contact, making it difficult to spread and evolve rapidly—especially considering that the main transmission routes (blood product use and needle use) have only been in existence for a short period of time.

1957

Scientists discovered the antiviral properties of *interferon*, a naturally occurring substance in 1957. It was named interferon since it has the ability to 'interfere' with viral replication. Three different types of interferon were identified—alfa, beta and gamma. While it was found that there is only one form of beta and gamma interferon, it was discovered that there were many forms of alfa interferon. Interferon was approved to treat a variety of disorders including hairy cell leukemia, and Kaposi's sarcoma.

1960-1970'S

Scientists developed blood tests to identify hepatitis B (1963) and hepatitis A (1973), but many of the blood samples taken for post-transfusion illness tested negative for hepatitis A and hepatitis B.

Given that the mode of transmission (blood transfusion) was the same, scientists classified the unidentified cases as non-A, non-B hepatitis. It is now believed that approximately 90-95% of cases previously

It was named interferon since it has the ability to 'interfere' with viral replication.

classified as non-A, non-B were actually hepatitis C.

In the 1980's, investigators from the Centers for Disease Control (headed up by Daniel W. Bradley) and Chiron (Michael Houghton) identified the virus. In 1990, blood banks began screening blood donors for hepatitis C, but it wasn't until 1992 that a blood test was perfected that effectively eliminated blood transfusion supply. Now the risk of contracting hepatitis C through a blood transfusion is approximately .001%. Prior to the screening of the blood supply for hepatitis C, approximately 300,000 Americans contracted hepatitis C through blood transfusions or blood products.

TREATMENT TIMELINES

1991 - FDA approves first alfa interferon (Schering's Intron A) to treat hepatitis C.

1992 - FDA approves first interferon (Schering- Intron A) to treat hepatitis B.

1996 - FDA approves alfa interferon (Roche- Roferon A) to treat hepatitis C.

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HealthWise:

Making Fitness Fun



Lucinda K. Porter, RN, CCRC

Exercise! The very thought of it can induce tears in those who do not enjoy physical activity. For those who have medical issues, exercise is an even more complicated venture. People living with hepatitis C report fatigue, muscle and joint aches. Depression, weight gain, and mental "fogginess" can also create obstacles. We know that physical fitness is "good for us." Healthcare professionals recommend exercise. Insurance companies and employers promote physical fitness because ultimately it is good for business. Just pick up a newspaper or turn on the TV and it's clear that athletes and sports are a popular part of our culture. Even the office of the President encourages exercise and has done so since 1956 with the creation of what is now known as the President's Council on Physical Fitness and Sports. Regular exercise is known to have a positive influence on a number of medical problems including arthritis, osteoporosis, back pain, diabetes, depression and cardiovascular disease. Certain fitness programs can improve flexibility, balance, tone, strength and stamina. Being physically active may improve sleep, reduce food cravings, and help us feel more energetic.

If this is true, then how do we get moving? The key may be the way we perceive exercise. If we view exercise as a chore or something that creates pain, then physical activity may feel like an obstacle. Perhaps the first step is as simple as replacing the words "exercise" and "fitness" with "play" and "fun." If exercise is seen as an act of recreation or play, it might help us to move in the right direction.

Being willing to move is important but not

enough to propel us off the couch. How do we get started? First and foremost, consult your health care practitioner. There may be medical reasons to limit or modify a fitness program. After medical advice is given then develop an action plan.

Start by setting short- and long-term goals. Goals should be reasonable, specific, measurable, and time-limited. Start small and gradually work up to a goal. If the long-term goal is to walk 30 minutes four days a week by the end of the year, then 5 minute walks 3 days a week for the next month is an example of a short-term goal. Attaching a reward to accomplishing the goal can be motivating. The reward can be something small, but still desirable.

Choose a healthy reward. A hot bath may be a better choice than a piece of chocolate cake. Other examples are new exercise clothes, like socks or a warm-up jacket; exercise gadgets, such as a pedometer or a heart rate monitor; and additional time for relaxation or engaging in a favorite activity.

Evaluate the goal. If the goal is reached, collect the reward as well as congratulations. What made the goal attainable? If the goal is not met, evaluate the reasons. Was the goal realistic? Is it a goal worthy of commitment? What interfered with reaching the goal? Can something be done differently that

will make the goal more achievable? Perhaps the goal was too big and needed to be broken down into smaller parts. Whether the goal is met or not, praise is important. The effort alone has merit. After goal assessment, set another or commit to the same goal. Continue to celebrate every victory.

Here are some other suggestions, especially when it is hard to maintain a fitness program:

- Show up and suit up. Some people find the

Start by setting short- and long-term goals. Goals should be reasonable, specific, measurable, and time-limited.

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BRIEF HISTORY

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1997 - FDA approves consensus interferon (Amgen- now InterMune- Infergen) to treat hepatitis C.

The general treatment protocol was to inject 3 million units of interferon, three times a week for 48 weeks. Sustained virological response rates (negative viral load 6 months post-treatment) were approximately 9% for genotype 1 and 30% for genotypes 2 and 3.

TREATMENT BREAKTHROUGH

1998 - FDA approves Rebetrone (Schering's Intron A plus ribavirin) for the treatment of hepatitis C.

Ribavirin is a synthetic nucleoside analogue with a broad spectrum of antiviral activity that was initially developed as a possible treatment of HIV. As it turned out, ribavirin was not effective against HIV, but it was found that it did have antiviral activity against several flaviviruses (a family of viruses that includes hepatitis C), and it was studied as a single agent for the treatment of hepatitis C. In some small studies, ribavirin was found to reduce serum ALT levels, but that it had no effect on the hepatitis C virus. The clinical findings that ribavirin reduced ALT levels led to the studies of combination ribavirin and interferon therapy. It was found that ribavirin when combined with interferon produced a synergy that proved to be a major breakthrough for treating hepatitis C. Ribavirin (in a mist form) is also approved for the treatment of respiratory syncytial virus (RSV) infection in children.

The treatment with combination therapy consists of interferon (Intron A - 3 million units thrice weekly) plus ribavirin (800-1200mg/day). The clinical trials conducted on com-

bination therapy also determined the duration of treatment for genotype 1 as 48 weeks and 24 weeks for genotypes 2 and 3. Overall sustained virological response rates are genotype 1 - 29% (high viral load - 27%); genotypes 2 and 3 - 62% (high viral load - 60%).

A NEW ERA IN THE TREATMENT OF HEPATITIS C

Synthetic interferon is a protein that is broken down rapidly by the body within 12 to 24 hours after injection. The standard protocol for interferon was to inject 3 times a week. The synthetic interferon was eliminated by the body, and, without further interferon available, the body could not suppress or kill the virus.

Pegylation is a process that attaches polyethylene glycol (a biologically inert compound) strands to the interferon molecule making it less likely to be cleared from the bloodstream. The benefit of increased concentrations of interferon levels is that these help to constantly suppress the virus and increase the likelihood of a sustained virological response.

2001

Peg-Intron (Schering's pegylated interferon alpha-2b) was the first pegylated interferon FDA approved to treat hepatitis C. Peg-Intron is a powder that needs to be reconstituted (with a sterilized solution) before it can be injected. Peg-Intron also needs to be dosed by a person's body weight.

The sustained virological response rates for Peg-Intron monotherapy are 14% for genotype 1, and 47% for genotypes 2 and 3.

PEG-Intron plus Rebetol (ribavirin) was also approved in 2001 to treat hepatitis C. Sustained virological response rates are 42% for geno-

type 1 (high viral load - 30%) and 82% for genotypes 2 and 3.

2002

Pegasys (Roche's pegylated interferon alpha-2a) was approved to treat hepatitis C in 2002. Pegasys comes in a ready made solution (does not need to be reconstituted) and in a dose fixed at 180 micrograms regardless of a person's weight.

The sustained virological response (SVR) rate for Pegasys is 28% for genotype 1, and 56% for genotypes 2 and 3. People with advanced fibrosis or compensated cirrhosis (a group that is more difficult to treat) achieved a SVR of 20%. This clinical trials on cirrhotic patients also showed that Pegasys reduced liver inflammation and scarring in treatment responders and, to a lesser degree, in non-responders. Data from this trial and other conventional interferon clinical trials led to the NIH HALT C trial that is studying the role of interferon in reducing liver inflammation and slowing or 'stopping/halting' liver disease progression.

In 2002 Pegasys plus Copegus (Roche's brand of ribavirin) was also approved for treatment of hepatitis C. Sustained virological response rates for genotype 1 are 46-51% (high viral load 41-45%) and 76-78% for genotypes 2 and 3.

It is clear that we have come a long way in a relatively short period of time in the understanding of HCV disease and the therapies used to treat it. We are by no means close to completely understanding and treating hepatitis C, but with increased research it is clear that we will have many more answers within the next 5-10 years and perhaps discover a medication that will be effective for treating everyone with hepatitis C.



The Importance of Water



Kara Wright, PA-C

Water is one of the most important things we take in on a daily basis. We all know we could live a few days without food, but without water, we are sure to suffer quickly. Our bodies are made up of about 70% water. That tells you how important the nutrient rich substance is. Water is especially important for people who have liver disease—whether on or off interferon treatment. It provides many important functions, which we will discuss here.

Water can actually help decrease fluid retention. At first glance, this seems counterintuitive. It doesn't seem like you should drink more water when you are retaining water, but it is true. When the body gets less water, it perceives this as a threat and begins to hold on to all the water it can. When this happens, the body tends to store water outside of our cells, which often causes swollen feet, legs and hands. Drinking more water will decrease the threat and allow the body to release the excess stored water, which decreases the swelling. Increases in salt intake can also cause water retention. In order to alleviate the symptoms, you should drink more water to dilute the effects of the salt. If this occurs often, you should be cautious with your salt intake. Some people are on restricted water and sodium intakes due to specific disease states. Please talk with your provider before changing any dietary recommendations.

One of our liver's primary functions is to rid the body of toxins.

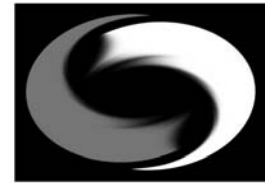
Water can help the body get rid of waste products and toxins as well, which helps the liver be more efficient. By staying hydrated, we can help the body efficiently shed all of the extra metabolized products and toxins.

Water suppresses the appetite. Many people feel hungry when, in fact, they are actually thirsty. Drinking a glass of water will often satisfy that sensation and decrease the desire for unnecessary calories. It also helps the body metabolize stored fat. Some studies show that a decrease in water intake will cause fat deposits to increase while an increase in water intake can reduce fat deposits.

Water can help the GI tract function better. When we are dehydrated, the body tries to keep all the water possible. As waste is going through the colon to be eliminated, water is absorbed to form solid stool. When we are dehydrated, too much water is absorbed causing very hard, dry stool, or constipation. By giving the body an adequate supply of water, we can prevent this from happening.

Dry skin is a common problem, particularly in patients on interferon treatment. Drinking water can help to moisturize the skin naturally and decrease the side effects, such as itching and flaking.

Water can also help regulate body temperatures. During the hot summer months, it is even more important to drink water in order to keep the body cool. We tend to dehydrate much more quickly in hot



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OCCULT INFECTION

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biopsy samples from all of the 57 patients with occult HCV and none of the controls. Negative-strand RNA was detected in 84% of these 57 subjects. (Positive-strand RNA can be used to directly manufacture viral proteins within an infected cell. Negative-strand RNA, in contrast, is used as a "template" to produce a complementary positive strand. Thus, the presence of negative-strand RNA indicates that the virus is actively replicating.)

In addition to the liver biopsy samples, the researchers also detected HCV RNA in the peripheral blood mononuclear cells (PBMC, a type of immune system white blood cell) in 70% of the 57 patients with occult HCV in their livers.

Patients harboring HCV genetic material in their livers were more likely to have liver inflammation and fibrosis than those with no evidence of hidden HCV. About one-third (35%) of patients with occult HCV had METAVIR inflammation scores of A1 or higher, versus 14% of those without evidence of HCV. Likewise, just over 17% of patients with occult HCV had stage F1 or higher fibrosis, versus about 2% of those with no detectable HCV in their livers.

In an editorial in the same issue of the *Journal of Infectious Diseases*, Hervé Lerat, MD, and F. Blaine Hollinger, MD, of Baylor College of Medicine suggested that doctors should measure both ALT and GGT to identify patients with suspected occult HCV. The study results suggest that testing of peripheral blood cells may be as informative as invasive liver biopsies. The authors noted that several mysteries remain, including whether hidden HCV genetic material is infectious that is, whether

people with occult hepatitis C can spread the disease.

Along with persistently elevated liver enzymes, extrahepatic conditions often associated with HCV infection may also suggest that occult virus is present. These include thyroid dysfunction, low platelet levels (which can lead to impaired blood clotting), lichen planus (an inflammatory condition of the skin and mucous membranes), vasculitis (blood vessel inflammation), and cryoglobulinemia (a condition in which abnormal proteins form in the blood and clump together, thus restricting blood flow). In the November 2003 edition of the *Journal of Viral Hepatitis*, for example, Milvia Casato, MD, and colleagues from Rome reported results from a study of three cryoglobulinemia patients with

no evidence of HCV antibodies or serum HCV RNA. Two of them were nevertheless treated with interferon and demonstrated good clinical response, but their cryoglobulinemia relapsed after interferon was stopped, suggesting that HCV was indeed the likely culprit. At the time of relapse, HCV genetic material was detected in blood protein clusters (cryoprecipitates) of both patients for the first time. In the third patient, HCV RNA was detected for the first time during a cryoglobulinemia "flare" associated with a herpes virus infection. The authors concluded that some cases of so-called "essential" (that is, unknown cause) cryo-

globulinemia are in fact due to occult HCV infection.

People with immune dysfunction may be especially likely to harbor hidden HCV, since their immune systems are less able to produce antibodies against the virus. Studies have shown that people with HIV (especially those with CD4 cell counts below 200) and transplant recipients taking immune-suppressing drugs often have HCV infection but no HCV antibodies. Marcel Beld and colleagues of the University of Amsterdam reported in the August 15, 1999 issue of *Blood* that injection

drug users (IDUs) sometimes had a prolonged period of being HCV antibody negative after infection (as long as eight years), and that some also had intermittently undetectable serum HCV RNA. The authors suggested that IDUs may have impaired immune function independent of their HIV status.

Research to date suggests that IDUs, people with HIV, and others whose immune function may be compromised should be tested carefully for HCV (possibly using PBMC or liver biopsy tests) if they have elevated liver enzymes or other signs that may indicate hidden HCV infection.

With more sensitive testing, occult HCV may prove to be the culprit behind many previously mysterious cases of liver disease. Like all people with hepatitis C, these patients should be considered for treatment since hidden HCV, like its more apparent counterpart, can lead to severe, long-term liver damage.

The authors noted that several mysteries remain, including whether people with occult hepatitis C can spread the disease.



News Briefs



Alan Franciscus, Editor-in-Chief

SCHERING ANNOUNCES AVAILABILITY OF ORAL RIBAVIRIN SOLUTION

On January 20, 2004 Schering-Plough announced the launch of Rebetol (ribavirin) oral solution for use in combination with Intron A (interferon) for treating pediatric chronic hepatitis C.

Oral Rebetol will come in a bubble gum flavor and is dosed according to body weight (15 mg/kg daily divided into a.m. and p.m. doses). Intron A is dosed according to the child's size measured in body surface area (3 MIU/m² three times

a week). Treatment duration for pediatric patients is the same as for adults: 48 weeks for genotype 1; 24 weeks for genotypes 2 and 3.

ROCHES ANNOUNCES FDA APPROVAL OF PRE-FILLED SYRINGES

On January 08, 2004 Roche issued a press release announcing that the U.S. Food and Drug Administration (FDA) approved pre-filled syringes of Pegasys for the treatment of hepatitis C.

Roche expects the pre-filled syringes to be available in pharmacies by the end of January 2004. Pre-filled syringes will be

packaged four per box and the price is expected to remain the same as the currently priced vials.

The combination of Pegasys plus Copegus (ribavirin) was approved in December 2002 for the treatment of chronic hepatitis C. Since then, Pegasys plus Copegus has captured the majority of the hepatitis C drug market in the United States.

Currently, Roche is evaluating the combination therapy in special populations, including African Americans and people coinfectd with hepatitis C and HIV.



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WATER

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temperatures, and most people don't even realize it. You don't have to be sweating to get dehydrated, so be aware and drink more water. You should increase the amount you drink if you exercise since this is another source of dehydration.

Patients on interferon monotherapy or combination therapy should be very aware of the body's need for water. Simply drinking more water can decrease many of the side effects experienced on treatment.

Many patients find it helpful to drink the highest volume of water for 1-2 days after the injection of interferon and then to continue to keep hydrated through the rest of the week.

As you can see, water is very important. How can you determine your body's water needs? There are many different ways to calculate this, but one formula is to divide your weight in pounds by 2 to determine the number of ounces you need to drink in a day. For example, if you weigh 180 pounds you will need to drink 90 ounces of water. That converts to eleven 8 oz glasses a day or $\frac{3}{4}$ of a gallon a day. (To help you convert ounces to cups or gallons, please follow this link: <http://www.easysurf.cc/cnver13.htm#fotog1>).

Another way to tell if you are adequately hydrated is to check the volume and color of your urine. The urine should be clear or pale yellow in color, and there should be lots of

it. The darker and less frequent your urine, the more dehydrated you are.

It is easy to keep track of your water intake. Purchase a sport bottle with the amount of fluid already measured for you. For example, most store bought water bottles tell you how many ounces of water they contain. Just keep filling up the water bottle and keep track of how many bottles you went through. It is

a good idea to keep a bottle at home, one at work, and one in the car.

Don't wait until you feel thirsty to drink water. At that

point, you are already slightly dehydrated and you will have to drink extra water just to catch up. The body does not have a strong thirst mechanism to tell you when you are dehydrated, so you must consciously drink water all day to ensure you are hydrated. Drink before you get thirsty.

Most people will feel that they are using the restroom very frequently. This is healthy. You should decrease your water intake 1-2 hours prior to bed, so you don't disturb your rest by having to get up to urinate throughout the night. If you know you will be somewhere in which a restroom is not easily accessible, you may wish to stop drinking water about 1 hour before your trip.

It is very important to avoid caffeinated drinks such as coffee, tea and cola. These beverages act as dehydrators by pulling water out of

your system. Also, sodas and coffee can cause headaches and diarrhea. If you are sick of drinking water, you can substitute other clear liquids. Be leery of sports drinks as they typically contain lots of sugars and sodium, which can cause dehydration as well. Drink these in small amounts.

If you have congestive heart failure, kidney disease, decompensated liver disease or ascites (fluid accumulation in the abdomen), it is very important that you speak to your medical provider before increasing your water intake. Patients with these illnesses are often on restricted water protocols due to the disease state.

Many patients find it helpful to drink the highest volume of water for 1-2 days after the injection of interferon and then to continue to keep hydrated through the rest of the week.

Water Hint

Many people believe that they drink the required amount of water daily, but most studies find that individuals actually drink much less water than they realize. A great way to check your daily intake is to buy bottled water that is equivalent to 90 ounces of water. Place the water bottles in an area that is highly visible throughout the day. The visibility will help you remember that you have to consume the water throughout the day.

FITNESS FUN

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act of putting on sneakers and starting the activity helps overcome mental resistance.

- Find a fitness buddy. We are less likely to cancel out on a friend than we are on ourselves.
- Join a group or class.

Common types of exercise focus on strength, flexibility, balance and aerobic endurance. Some activities combine all of these elements, while others concentrate on one aspect. It is advisable to begin exercise by warming up and to practice the habit of stretching and cooling down. For those new to exercise, a reasonable beginning regimen might be to walk a few minutes, stretch, and call it a day. Always allow a day of rest between weight training workouts. Some fitness trainers recommend a day of active rest every week. Active rest means taking a break from a regular fitness regimen but does not mean spending it all on the couch.

Walking, hiking, swimming, dancing, bicycling and weightlifting are some common recreational activities. Physical fitness is more likely to be successful if it is portable, not dependent on the weather, and fits any budget. Staying fit does not have to be an all or nothing proposition and can fit into the busiest schedules. Some ways to do this include gardening, using the stairs, choosing a parking spot on the outskirts of the lot, getting off the bus before the scheduled stop and walking the rest of the way, window shopping, sweeping the floor, and mowing the lawn. Replace power tools with manual tools. Mowing the lawn with a push mower is an

excellent way to be active. Walk instead of driving. Don't use the remote control when watching T.V. Talking on the phone or watching television are excellent opportunities to stretch, do leg exercises or lift light weights. Any opportunity to be active helps us to stay in shape.

Just as in life, variety is an important aspect of exercise. If you walk, add activities at various intervals that increase your heart rate and use other muscles. Examples of this: Every 5 minutes of walking, try skipping for a minute, or do 4 lunges, or 2 minutes of speed walking. If you use weights for toning, try a session using light weights with 20 to 30 repetitions, and another session using heavy weights and perhaps only 5 or 6 repetitions. You can also vary the speed of your workout. Lifting weights at a very slow rate can be incredibly challenging. Some local parks and trails have workout stations call "par courses." These are free and a simple way to add variety to your walk or run.

Be sensible about exercise. Remember to drink water, apply sunscreen and avoid injuries.

Pain is NOT gain. However, sore muscles may occur. Heat, cold packs, and stretching may be beneficial. Remember to consult a doctor for injuries and discuss a back-up fitness plan for common injuries. Avoid exercise when ill.

Videos, magazines and books can be useful resources. Choose sources that target your age and fitness needs. I read *Prevention* magazine because it is practical, motivating and easy to carry around with me. Many communities and employers offer groups and classes. The Internet has in-

formative sites. Try doing a general search using "exercise" or "physical fitness" as key words. Information about The President's Council on Physical Fitness and Sports and the President's Fitness Challenge can be found at the end of this article. Information for people with disabilities is provided on The President's Challenge web site.

We have access to a coach 24 hours a day. It is the one we carry with us. Most of us respond to a supportive coach. Skip the criticism. Show up, suit up and keep a positive attitude. The effort is worth it, especially when fitness becomes fun.

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