Our May 25th Half Day meeting was well received with two informative and timely topics capped off with ample time for networking with breakout groups for cardiac and pulmonary rehab professionals. Networking provides us all with a chance to share ideas and practices with each other so we don’t feel like we are working in a silo and that we have support from each other. This is what I value most from my connection with MACVPR… support and sharing of ideas. Coming from a small program, it has always been invaluable to network with my colleagues here at our meetings to see how they handle certain issues and practices, and gather ideas for my own program. We plan to continue to offer plenty of networking time at our half-day meetings in the future.

Our annual MACVPR New England Symposium is scheduled for October 19, 2017 and has a dynamic line up of speakers highlighted by Quinn Pack, MD. Dr. Pack is one of our own from Massachusetts, and is a very active speaker on the national level. He will deliver a summary of current research in the field of rehabilitation. The symposium will once again be hosted at the Hampton Inn in Natick. Mark your calendars now!

I was very sad to make the announcement last month that our wonderful administrative assistant, Jessica Dion, will be leaving us this summer as she is moving out of state. I am very happy to now announce that her mother, Lisa Dion, will be assuming her position! Lisa will be a great addition to our team and has already begun training with Jessica to ensure a seamless transition in the administrative duties. I am sure you will all join me in giving a warm welcome to Lisa!

I am also excited to say that we have two members who have shown interest in being more active on the Executive and/or Education Committees and attended our recent Executive Committe meeting on June 15th. One individual is interested in the President Elect position, but would love to share this role with another member to lessen the load. It’s a great opportunity to get involved, while also having someone else to divide up responsibilities with. We also need a Newsletter Editor - Melissa Tanguay is stepping down, as she no longer works directly in cardiac rehab. She is more than willing to train someone in the computer program that she uses. If you have a creative side to you …why not give it a try!

Please contact me at lynne.macdonald12@gmail.com if you have any interest or would just like more information on the positions. We need your help!

On the national level, AACVPR is hoping to gain some further traction with their “Finding the N, Phase 2” project and has enlisted our help once again to ask all of you to complete a Survey Monkey on the number and types of clinicians working in your cardiac and pulmonary rehab programs. We will send out emails very soon. Please complete the survey as soon as you can. This information benefits both AACVPR as well as MACVPR.

AACVPR is also working on a new initiative to increase reimbursement for pulmonary rehab. As those of you know that work in pulmonary rehab, reimbursement is in the mid 50’s range, which is far below what it should be, given the acuity and intensity of the...
services that this patient population requires. AACVPR has now developed a task force whose priority is to strategize ways to increase reimbursement for pulmonary rehab. They have started by getting data from CMS from 2015 on programs that submitted claims for pulmonary rehab and have weeded out programs that have submitted less than 250 claims per year, as they are “smaller” programs. We are currently waiting for more instructions to come, but will likely be asking “larger” programs to get involved in grass roots efforts to increase reimbursement. As soon as we get further information, we will pass it along to all of you. We all need to work together to get pulmonary reimbursement increased, as we successfully did for cardiac rehab in the past.

On the legislative side, per the June 21st reimbursement update, HR 1155 and its Senate companion bill have seen slow progress. HR1155 has only 28 sponsors to date. I urge you once again to please contact your congressperson’s office and request co-sponsorship of this important technical correction.

I once again want to invite anyone to attend our Executive Committee meetings to see how we function and maybe consider getting involved on some level. We really need your help! Everyone has something to offer. Our next meeting will be September 14th in Framingham.

I hope you all have a happy and restful summer with your families and friends. I look forward to seeing you once again in October at the symposium! Maybe even a few of you will be going to the AACVPR conference in Charleston, South Carolina I hope!!!

Lynne MacDonald PT, CCRP
MACVPR President

LETTER FROM THE EDITOR

As Lynne mentioned in her President’s Address, I will be stepping down as newsletter editor at the end of this year, as I no longer work directly in cardiac rehabilitation.

It has been fantastic experience and an honor to work with the very dedicated MACVPR Executive Committee, and I would encourage anyone considering the role of Newsletter Editor to just go for it! In addition to the opportunity to work on an executive committee, it is an honor to work with our knowledgeable contributors. The position is also a great way to stay up-to-date on all the important changes unfolding in the fields of cardiac and pulmonary rehabilitation and plays an important role in ensuring that MACVPR members are well-informed with changes and developments that impact their programs.

President Lynne MacDonald (who happens to be the former Newsletter Editor) offered to speak with anyone interested about the role and I’m happy to do the same. I can be reached at mtanguay@partners.org with any questions.

Melissa Tanguay, BS, ACSM-CEP
Exercise Physiologist, Massachusetts General Hospital

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Legislative & Reimbursement Update

Wayne Reynolds, RN, FAACVPR, CCRP

HR 1155 UPDATE
Good news! We now have a Senate Bill that is a companion to HR 1155 - Senate Bill S 1361. Both bills are amendments to section XVIII of the Social Security Act allowing physician extenders (PAs and NPs) to supervise cardiac, intensive cardiac, and pulmonary rehabilitation programs.

In the past this amendment has not made it off the senate or house floor. This time we have more confidence that once on the floor, the bills will actually be voted on. As mentioned in the past, the BEST way to secure adequate votes for passage is to have a significant amount of co-sponsors.

Last year, both MA Senators co-sponsored the bill. Though S 1361 is very new, Senator Warren has been an early signor; however, Senator Markey’s staff has thus far ignored my requests for a meeting. The current staffer responsible for healthcare matters has not returned emails or calls. My last email to her was to let her know I was requesting the MACVPR to email, write, and call her to impress upon her the importance of S 1361. This is where your help is needed! A barrage of emails and letters from MACVPR affiliated constituents will be a sure way to get her attention.

Tips for communicating with your U.S. Senators’ and U.S. House Members’ Home District Office:
- Explain that you are representing cardiac and pulmonary rehabilitation for your state’s providers and patients.
- Try to immediately speak with the person responsible for health issues, but understand that every office operates by its own rules and email may be the preferred method of initial contact.
- Address an email to the congressional member AND to the person whose name you’ve been given as responsible for health care issues for the congressional member.
- Follow-up when you said you would and keep trying. It is your congress members job to be aware of and care about health care issues that could help or hinder access of vital services for Medicare beneficiaries.

The rest of our MA congresspersons need your help to understand how important their co-sponsorship of this bill is. There is an easy-to-use email template on the AACVPR Advocacy/Day on the Hill page to make contacting them a quick and easy process. Here are their staff email addresses:
- Richard Neal, 1st District – elizabeth.ohara@mail.house.gov
- James McGovern, 2nd District – mike.cusher@mail.house.gov
- Niki Tsongas, 3rd District – anna.platt@mail.house.gov
- Catherine Clark, 5th District – david.bond@mail.house.gov
- Michael Capuano, 7th District – Robert.primus@mail.house.gov
- Stephen Lynch, 8th District – mariana.osorio@mail.house.gov
- William Keating, 9th District – michael.wertheimer@mail.house.gov

These staffers will only meet with their constituents – so if you are one, please reach out. I, personally, was able to meet with both Seth Moulton’s as well as Stephen Lynch’s staffer as I work in their districts and they understand that I represent their constituents. Lynch seems to need a small amount of reinforcement from others before he signs on, so if you live in his district, please reach out.

SUPERVISED EXERCISE FOR PERIPHERAL ARTERY DISEASE (PAD) - THE NEW CODES ARE OUT!
What an opportunity for programs and patients! Cardiac and pulmonary rehab programs have been treating PAD patients for years (as a “side” co-morbidity and significant limitation), so who continued on page 4...
better to be treating them now that reimbursement is available? Get ready, as the ICD 10 codes are effective on October 1, 2017 and billing information is being developed by CMS. Stay tuned to the AACVPR updates as October approaches.

**BUNDLED PAYMENTS**

They are coming! If you are not aware of which payment model your hospital/program will be under, FIND OUT! I will be happy to be of help in guiding you through the information. The final effective date is January 1, 2018 so do not wait until the change is impending!

**PULMONARY REHAB COST REPORTING**

Pulmonary rehab cost reporting was the topic that took up the majority of the June Medicare Administrative Contractor (MAC) Task Force conference call. The last round of CMS changes saw dismal outcomes, with subsequent poor changes in reimbursement for pulmonary rehabilitation services. As a result, Pulmonary Rehab Toolkit is back to assist programs in reporting their actual cost of delivering service. This does NOT mean patients will have higher co-pays or that they will be affected in any way. It’s simply the ONLY way to get CMS to accurately understand the amount that each program puts into each pulmonary rehab session. CMS recognizes that they are not paying enough and have requested this cost reporting, but any changes require adequate reporting of cost. The reality is that EVERY program needs to participate in order to make this work.

Unfortunately, I have had pulmonary rehab staff and managers express feeling intimidated and ignored by “finance” and being told by financial staff that their program was not significant enough for them to bother to assess real cost. We strongly encourage program managers to set aside concerns with dealing with institutional financial departments, concerns regarding increased costs to patients, or other barriers they have in the way of reporting the actual cost to run their programs. Keep in mind that in the current landscape many hospitals and hospital systems are finding themselves in financial difficulty, so no amount of revenue will be considered “insignificant”. So, if you do manage a program, please use the Pulmonary Rehab Toolkit and contact your finance department as soon as possible. If you are a staff member, please discuss this with your manager. Taking steps to help increase your department’s reimbursement amount from Medicare may just be what prevents the loss of your program in the future.

Please remember that as MAC Liaison, I am here to help, so do not hesitate to contact me with questions or for guidance and I can direct you to the resources available to assist you.

**Contact Information:**

wayne1956@comcast.net, wreynolds@signature-healthcare.org. wreynolds@partners.org. 508-930-5678

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**MACVPR LOCAL CHAPTER UPDATES**

**TREASURY REPORT**

_Donna Hawk, RRT, AE-C_  
Treasurer

**AS OF JUNE 14, 2017:**
- Checking - $15,560.05
- Money Market - $2,635.62
- Total - $18,195.67

**MEMBERSHIP REPORT**

_Diane Gaughran, BS, ACSM-RCEP, CCRP_  
Membership Chair

**AS OF JUNE 14, 2017**

The MACVPR currently has 107 members. Just a reminder, your AACVPR Joint Affiliate Membership includes:

- **Continuing education opportunities:**
  - Two half-day complimentary meetings
  - Reduced registration fee at the Fall Full-Day Membership meeting with national speakers

- **Full access to MACVPR and AACVPR websites including:**
  - EducationAdvantage webinars and CEUs from AACVPR
  - Latest updates on reimbursement and legislation
  - Tri-annual ‘MACVPR NEWS’ newsletters
  - Certification updates

- **Networking with other professionals in our fields**

**OTHER MEMBERSHIP UPDATES:**

Finding the "N", Phase 2

We have been asked by AACVPR again to help with finding the "N". As a result, MACVPR will be sending out emails with a survey - both to those who have not responded to AACVPR’s request in the past, as well as to new MACVPR members. If you do receive this email, we ask that you please respond so that AACVPR can continue to collect this important information. AACVPR believes that “finding the N” is critical as we continue to evaluate and adjust our association’s mission and goals in response to changes in the cardiac and pulmonary rehab arena.

If you have any membership questions, please do not hesitate to reach out to Diane Gaughran at diane.gaughran@steward.org.
Paulette Pontier MSN, CNL, CCRP
Education Co-Chair

ON MAY 25, 2017 MACVPR HELD A HALF-DAY MEETING AT THE HAMPTON INN IN NATICK. Forty people attended, and the day featured two lectures and a breakout networking session. The formal lectures were on Exercise for Peripheral Artery Disease and High Intensity Interval Training for Patients with Chronic Disease. A summary of each session is below. For the breakout session, we asked our members to bring copies of their current ITP to share. Participants divided into two groups based on area of focus - cardiac rehab or pulmonary rehab. Each group had a facilitator to help stimulate discussion and sharing of information. ITPs were discussed, as well as several pertinent topics of interest to each group. There was plenty of robust discussion and sharing of information in both groups. It was a success!

SESSION 1: EXERCISE FOR PERIPHERAL ARTERY DISEASE
Dr. Robert Patterson, a Clinical Professor of Surgery at Brown University’s Alpert School of Medicine, spoke on exercise for the patient with peripheral artery disease (PAD). This was a very pertinent lecture since Medicare recently approved PAD as a diagnosis for cardiac rehab. Dr. Patterson began with a history of claudication therapy, citing studies that were done in the 1960’s and 70’s. He noted that “numerous studies of medically supervised exercise have been performed over the years with surprisingly consistent results, given the increasing age and frailty of the population with peripheral arterial diseases.” For example, a study by Larsen and Lassen in 1966 prescribed daily exercise to tolerance for seven patients while another seven patients were given a placebo pill. In this study, the exercise group improved 300% while the placebo group had no changes. In contrast, patients that were treated surgically found their symptoms increased.

Dr. Patterson also discussed more recent studies that compared exercise therapy against more modern surgical intervention. He cited the recent Claudication: Exercise vs. Endoluminal Revascularization (CLEVER) study, which reported results after an 18-month period that support the “durability and success of supervised exercise.” The CLEVER study also showed that inserting a stent for treatment was five times more expensive than a supervised exercise program. Similarly, the cost effectiveness of supervised exercise for the treatment of intermittent claudication in a study done by Bermingham, et al showed that the “quality-adjusted life year gained would be considered highly cost effective by policy makers worldwide.”

ABOVE: The Claudication Scale should be used to help guide exercise for patients with PAD. Rest should be initiated when pain reaches a 3 to 4 on the scale during exercise.

MECHANISMS BY WHICH EXERCISE MAY IMPROVE FUNCTION AND SYMPTOMS IN CLAUDICATION

Dr. Patterson also discussed the practical components of a supervised exercise program for PAD. Pre-testing for all patients should include a non-invasive vascular exam, medical evaluation, cardiac screening and a progressive treadmill test. He also included specific questions to ask the patient such as: Where does the pain occur? Is the pain relieved by rest? Does the pain return if you begin walking a second time? Do you have any sores or cuts that haven’t healed?

During exercise, the Claudication Scale should be used to assess pain the patient has when walking on the treadmill to help determine when they should stop and rest. Generally a rating of 3-4 out of 5 on the claudication scale would warrant rest, until the pain subsides. Once it subsides, exercise should be resumed. Education is also an important factor in the supervised exercise program for patients with PAD.

For more information on implementing an exercise program for PAD visit vasculardisease.org/files/pad-exercise-training-toolkit.pdf.

SESSION 2: HIGH INTENSITY INTERVAL TRAINING FOR PATIENTS WITH CHRONIC DISEASE

Nathan Crawford, MS, CSCS is an exercise physiologist in cardiac rehab at Harrington Healthcare in Southbridge, MA. His lecture began with a review of Moderate Continuous Training (MCT), which has been the norm for most cardiac and pulmonary rehab programs. MCT is comprised of continuous, steady-state exercise for an extended period of time at an RPE of 11-14. MCT has traditionally been used because it was thought that vigorous activity might increase the risk of sudden cardiac death or MI in cardiovascular disease patients.

In contrast, High Intensity Interval Training (HIIT) is characterized by alternating short periods of vigorous exercise, with low intensity exercise or rest periods. With a HIIT program, the more intense exercise is generally performed at an RPE >14 or >80% peak HR or VO2 with periods of less intense training at an RPE <11 or <70% peak HR or VO2. Studies have demonstrated that HIIT can be successfully and safely used in many chronic disease patients. Furthermore, HIIT programs may be more appropriate for higher fitness level patients for whom MCT may provide suboptimal benefits. Exclusion criteria for HIIT include: angina during MCT, recent MI (with 4 weeks or less), fixed rate pacemaker, uncontrolled hypertension or diabetes, and symptomatic aortic stenosis.

When comparing the two types of training programs, there is greater improvement in both aerobic and anaerobic fitness levels with HIIT when compared to MCT. For example, recent studies in chronic disease have shown that HIIT provides a 2-17% greater increase in VO2 max when compared to MCT. In cardiac rehab populations, studies have found HIIT programs associated with improved endothelial function, lower blood pressure, lower triglycerides, lower fasting glucose levels, improved cardiac function, and higher energy expenditure. From a psychosocial perspective, patients generally gain more confidence, have better adherence to exercise, have more enjoyment of exercise, and experience overall improved quality of life.

In pulmonary rehab populations, patients with COPD also demonstrate improved outcomes when HIIT is compared to MCT programs. This includes less reported dyspnea, reduced leg discomfort, as well as greater improvement in submaximal endurance and peak exercise.

While protocols may vary, one standard HIIT protocol includes an extended warm-up, followed by intervals of 4 minutes at 85%-95% of peak heart rate, then 3 minutes of 60-70% of peak heart rate, ending with a cooldown. However, patients should not start with this type of training. Typically patients would usually start with a standard MCT program for 1 to 2 weeks before progressing to HIIT. The initial duration of high-intensity intervals would be brief (30-60 seconds), broken up by light to moderate intensity stages between 1 to 5 minutes long, depending on the patient. Programs generally begin with one supervised session of HIIT per week and gradually progress to 3 sessions per week.

FUTURE MEETING DATES

MACVPR will hold its annual fall symposium on October 19, 2017 at the Hampton Inn, Natick, MA. The agenda with speakers and topics will be coming soon. Hope to see you all on October 19th.

LEFT: A sample protocol for an interval training program. Keep in mind that HIIT programs aren’t just for running! Programs can use a variety of modalities, including walking, biking, elliptical, Nu-Step, or arm ergometer.
IN PART II of II, HOLLY HELPS US DEBUNK SOME MORE NUTRITION MYTHS. There are so many of these so called “myths,” and many of them can be quite believable!

**MYTH: As long as you’re eating healthy foods, calories don’t matter**

**Truth:** There can be too much of a good thing. I appreciate it when I have a patient come in and say that they are making healthier choices but are frustrated by the fact that their weight loss has hit a plateau. As I listen further to their dietary intake, I often soon understand the problem. Here are some examples I commonly hear in practice:

- “I’m eating nuts instead of chips.”
- “I have been eating a whole avocado in my sandwich to include more healthy fats,” vs. mayonnaise.
- “I put olive oil on everything because I know it’s healthy vs. butter.”
- “I enjoy Teddy’s natural peanut butter by the spoonful because it’s organic, unprocessed and full of healthy nuts.”
- “Granola is my new cereal and I put it in yogurt and salads.”
- “I have switched to whole grain rice vs. white rice and whole wheat pasta vs. white pasta and still cannot lose weight.”

While I love to congratulate my patients for making such great food choices but are frustrated by the fact that their weight loss has hit a plateau. As I listen further to their dietary intake, I often soon understand the problem. Here are some examples I commonly hear in practice:

**MYTH: As long as you exercise, you can eat as much as you want**

**Truth:** If this were true wouldn’t this be nice? Exercise is a wonderful way to keep your cardiovascular system healthy, and paired with a healthy diet one can achieve their fitness goals. The problem occurs when eating exceeds the workout goals. Think about the time you may have had a couple of cookies after lunch (350-400 calories) a piece of cake (400 calories) or a cup of ice cream (350-400 calories depending on the flavor). What would it take for you to burn these calories at the gym? For most of us, it would take about 3-4 miles of walking or running to burn these calories. Now, think about how often YOU exercise and how often do you treat yourself? So essentially, “a moment on the lips” can mean an hour or more on the treadmill. You can still indulge in your treats, but keeping track of your fitness goals and how much you are burning and how much you are taking back in will help you to stay on track.

**MYTH: It’s always a good idea to go with the salad**

**Truth:** A salad is a wonderful option when dining out BUT it also depends on what is IN the salad. We all know that cheese crumbles, croutons, salad dressing, dried fruits and nuts along with the portion of the protein in the salad (chicken, fish, steak) can truly drive up calories. So, is it better to order a cheeseburger and fries? Of course not. But when ordering a salad, be cautious to find out what is included and the portions of those ingredients. Sometimes you can ask for no croutons, less cheese and dressing on the side. It may not seem like a big change, but you could be saving over 400 calories for making these changes depending on how generous the portions are within the eating establishment. Do this every day and you could easily lose close to a pound per week.
Antiplatelet Therapy: What to Know About Aspirin

Yue See Lee, RPh
Pharmacist, Beth Israel Deaconess Hospital - Milton

ASPIRIN IS A VERY COMMON MEDICATION PRESCRIBED BY PHYSICIANS. It is routinely used if you’ve suffered a heart attack or have risk factors for heart attack, such as chest pain (angina) or various heart surgeries. Aspirin is also used if you’ve had a stroke caused by a blood clot.

Aspirin is an old drug that has been sold in its synthetic form for over a hundred years but was originally derived from the bark of the willow tree. It decreases your blood’s tendency to clot and also serves as a pain reliever. At the same time, however, it can promote bleeding (stomach and brain).

The most current guidelines from the United States Preventive Services Task Force (USPSTF) states that for patients age 50-69, low dose aspirin (81 mg) is recommended if you have a high risk of cardiovascular disease. If your age falls outside of this range, you should discuss with your doctor about the risks and benefits of using aspirin in terms of your individual medical conditions. There are additional circumstances where use of aspirin may be beneficial (such as diabetes, colon cancer, and blood clots in the legs).

If you have not had a heart attack or stroke, but want to know about your risk for cardiovascular disease, listed in the side bar of this article are some online sites to help you calculate your Framingham Risk Score, which tells you your risk for developing cardiovascular disease within the next 10 years. A score higher than 10% indicates that aspirin should be used.

THE MOST CURRENT GUIDELINES FROM THE UNITED STATES PREVENTIVE SERVICES TASK FORCE (USPSTF) STATES THAT FOR PATIENTS AGE 50-69, LOW DOSE ASPIRIN (81 MG) IS RECOMMENDED IF YOU HAVE A HIGH RISK OF CARDIOVASCULAR DISEASE.

In the United States, aspirin comes in a low dose “baby” aspirin (81 mg) and a higher dose (325 mg). In general, 81 mg is sufficient for cardiovascular disease prevention, while the high dose of 325 mg is reserved for emergency situations such as a heart attack and also for treatment of pain.

WEBSITES TO HELP YOU ASSESS YOUR RISK OF DEVELOPING CARDIOVASCULAR DISEASE:
- cvriskcalculator.com
- mdcalc.com/framingham-coronary-heart-disease-risk-score
- framinghamheartstudy.org/risk-functions/

As for all drugs, aspirin has some side effects. It can cause increase risk of bleeding, of which the most significant are bleeding in the stomach (ulcers) or bleeding in the brain (hemorrhage). Some symptoms include stomach upset after taking aspirin, dark stools, or more seriously, vomiting fresh blood or dark dried blood. To prevent bleeding, take aspirin with food or with medications for heartburn such as famotidine (Pepcid) or omeprazole (Prilosec). Other ways to prevent bleeding include minimizing or eliminating alcohol intake and avoiding use of certain pain medications called NSAIDs (e.g. ibuprofen and naproxen).

Aspirin is but one of the many drugs in our arsenal to promote heart health after a heart attack or stroke, or if you have a higher risk for developing these conditions. Do not stop taking aspirin without discussion with your physician.

Because this article is not an exhaustive review of the use of aspirin and its side effects, specific concerns about this medication and your condition should be address with your physician or pharmacist.
KEEP ON MOVING

**Exercise and Activity for Individuals with Nonspecific Low Back Pain**

Nathan Crawford  
*Exercise Physiologist, Harrington Hospital*

**LOW BACK PAIN IS A SIMPLE TERM THAT IS USED FOR A MUCH MORE COMPLEX AILMENT THAT IS USUALLY MANAGED BUT NOT CURED.** An extensive system of nerves supply the spine, surrounding joints, muscles, ligaments, and tissues which makes it very difficult to determine the precise source of pain for those with low back problems. Low back pain is associated with a variety of personal, physical, and psychosocial factors. Personal risk factors include age, gender, height, body build, spinal abnormalities, and previous history of low back problems. However, some risk factors are modifiable and these include weight, physical fitness, and smoking. Having a previous history of low back pain has consistently been one of the most reliable predictors of subsequent low back pain. Some social and work-related factors that are associated with low back pain include heavy physical work (manual labor), lifting and forceful movements, awkward postures, and whole body vibration.

**Pain Assessment**

One should check for “red flags” when screening for low back pain, which may be indicative of a potentially more serious condition. These red flags include urinary retention, saddle anesthesia, pain that gets worse when lying down, severe continuous nighttime pain, weight loss, and fever. The New Zealand Low Back Pain Guideline has a classification system that categorizes low back pain as either acute, chronic, or recurrent. Acute back pain is defined as having symptoms for less than 6 weeks. Chronic back pain is defined as having symptoms for more than 12 weeks. Recurrent low back pain is defined as episodes of acute low back pain lasting less than 3 months but recurring after a period of time without symptoms.

Since pain is subjective, self-report should be the primary form of assessment. Assessment should focus on pain intensity, affect, and distribution. Pain is typically measured on a 0-10 rating scale.

Patients with low back pain have difficulty tolerating spinal loads and their motion is generally slower than those without low back pain. A battery of performance tests have been developed that can be used to measure the level of impairment resulting from the low back pain. There are timed tasks that include repeated trunk bending, sit to stand time, and a 50-foot walk speed. There are also distance tasks that include a 5-minute walk distance and the distance that can be reached forward while holding a 4.6 kg (~10 lb.) weight.

**Exercise Recommendations**

A lot of factors play a role in how low back pain should be managed and thus, pain cannot always be the only symptom used to guide activity.

For a significant, acute injury it is best to reduce activity for a couple days and treat the pain (ice). With an acute injury you can use pain intensity and duration to guide activity. The period of inactivity should be limited by time however, not pain. An early return to activity should be encouraged.

This should not be the approach to exercise for chronic or recurrent low back pain, as it may be harmful. Since this type of back pain is not indicative of an ongoing tissue injury and the pain is likely to persist, pain cannot be a guide for activity. Exercise professionals should acknowledge the presence of pain, provide reassurance, and advise patients on the resumption of exercise. Normal activity and exercise is a fundamental aim of pain management for both acute and chronic low back pain.

continued on page 10...

**Cat Pose**

**Cow Pose**

ABOVE: Exercises like cat and cow pose can be a beneficial component of an exercise routine for lower back pain.
The Agency for Healthcare Policy and Research (AHCPR) contains some recommendations for exercise for low back pain. These include:

1. Inactivity can cause debilitation and even make symptoms worse. Low stress, aerobic exercise (recumbent bike, Nu-Step, elliptical) should be the first choice for patients returning to exercise, as it will help progress them back to their highest appropriate level of function.

2. Aerobic exercise programs that provide minimal stress to the back (biking, swimming, slow walking) can be started quickly for individuals with an acute low back injury.

3. Conditioning exercises for trunk muscles (hip bridge, plank) are helpful for patients with low back pain and should be gradually increased.

4. Machine back specific exercises provide no additional benefit.

Most individuals with low back pain have weak trunk muscles and this causes the spine to become stiff. The exercise prescription should also include aims to improve trunk strength, endurance, and flexibility.

Overall it seems clear that exercise is beneficial for those with low back pain because it increases blood flow to the muscles, can help them relax, while reducing the perception of pain. It is less clear whether the intensity, duration, or frequency of exercise is important when prescribing exercise. Low stress aerobic exercise and increased trunk endurance seem to be the optimal form of training for those with acute and chronic low back pain. The consensus is that rest is detrimental for low back pain. This can lead to further debilitation and may prolong the healing process.

Below is an example of a fitness program circuit that was used in a study for patients with low back pain. In this study, the circuit was completed for 8 sessions:

- Static cycling (increase resistance gradually, not speed)
- Supine free weight exercises
- Standing knee raises
- Repeated sit to stand
- Wall push-ups
- Hip bridges
- Step-ups
- Supine medicine ball lifts
- Static jogging on trampoline
- Cat and cow yoga stretches
- Gradually increased walk speed
- Supine leg lifts
- Supine abdominal crunch
- Jump rope

Patients that participated in this program showed a 7.7% reduction in pain and disability compared to just 2.4% for the control group.

References:
Summer 2017 ECG Challenge: Similar EKG Tracings In Different Diagnoses

Deirdre Proudman, MSN, RN-BC, CCRN
Lowell General Hospital

TRACING 1:

TRACING 2:

TRACING 3:

QUESTION 1 – Analyze the above tracings using the 5 steps of rhythm analysis (30 large boxes across the top equal a six second strip):

Rhythm _______________  PR Interval   ____________   P wave   _______________
Rate   _________________   QRS complex duration and morphology __________________

QUESTION 2 – Interpretation for all tracings:
A. Normal sinus rhythm with inverted T waves in lead III
B. Second degree AV Block Type II
C. Junctional tachycardia with inverted T waves
D. Accelerated idioventricular rhythm with ST-T wave changes

QUESTION 3 – It is safe to assume that all three of these patients have the same diagnoses based on similar telemetry and could be managed in a group with their exercise prescription and individualized treatment plans (ITP).
A. True
B. False
QUESTION 4 – T-wave inversion on an EKG may indicate which of the following?

A. Normal variant
B. Electrolyte imbalance
C. Bundle branch block
D. Myocardial ischemia
E. Left ventricular hypertrophy
F. Manifestation of past MI
G. Pulmonary embolism
H. b, d, and f
I. All of the above

QUESTION 5 – Describe the characteristics of a T wave as a component of the various intervals on the EKG tracing:

A. The T wave is the ECG manifestation of ventricular repolarization of the cardiac electrical cycle.
B. Inverted T waves may represent evolving ischemia.
C. The interval from the S wave to the apex of the T wave is referred to as the absolute refractory period.
D. Atrial arrhythmias can be initiated by a PAC that falls on the apex of the T wave.
E. Inverted T waves may represent an old infarction.
F. Hyperkalemia may lead to T wave inversion.
G. a, c, and e
H. a, b, c, and e
I. All of the above

QUESTION 6 – Below you will find descriptions of the patients associated with the above trainings. Apply the possible indications for T wave inversion to the below scenarios.

Tracing #1: 65 year old male with history of HTN presented for a stress test. He was asymptomatic. Father died of MI at age 41. Stress test was obtained in part for the purpose of initiating a PD5 inhibitor. He was asymptomatic on the TM and completed almost 10 minutes without issue. He developed ST depression in stage II and significant depression in V4-V6. Catheterization revealed 95% proximal left anterior descending artery (pLAD l) lesion treated with a drug eluting stent, DAPT, and aggressive risk factor education and modification.

Tracing #2: 60 year old male who initially presented to the emergency department with chest pain and shortness of breath. He had been housebound for several weeks due to his symptoms. He has no history of coronary artery disease, but has significant risk factors including diabetes, hypertension, and tobacco abuse. Medications at discharge include daily aspirin, insulin, ace inhibitor, beta blocker, and a diuretic. Admitting BP was 200/110mmHg, brain natriuretic (BNP) 1812 pg/ml (reference <100); troponin I, 0.072 ng/ml (reference <0.04), ejection fraction 45%. The final discharge diagnoses was determined to be heart failure. BP and anginal symptoms were managed with guideline based pharmacological therapy and risk factor modification.

Tracing #3: 65 year old male with one day of persistent chest pain symptoms; abnormal EKG: inferior Q’s and STE; h/o dyslipidemia; PPCI activated inferior-posterior STEMI; troponin 35. Patient intervention: primary percutaneous coronary intervention (PPCI) of ostial distal RCA w/2 overlapping Synergy DES stents.

QUESTION 7 – Which of these patients may benefit from interval training?

ANSWER TO QUESTION 1: Regular
ANSWER TO QUESTION 2: A (normal sinus rhythm with inverted T waves in lead III)
ANSWER TO QUESTION 3: False
ANSWER TO QUESTION 4: I (all of the above)

The T wave is the most labile wave in the EKG. Inverted T waves may be the result of many cardiac and non-cardiac conditions. The T wave is normally upright in leads I, II, and V3 to V6; inverted in lead aVR; and variable in leads III, aVL, aVF, V1, and V2. Thus, T-wave inversions in lead 3 shown here may be fully normal. An inverted T wave in a single lead in one anatomic segment (i.e., inferior, lateral, or anterior) is unlikely to represent acute pathology; for instance a single inverted T wave in lead III or aVF can be a normal variant. All monitor changes and questions would need to be followed by a 12 lead EKG and compared to previous tracings.
ANSWER TO QUESTION 5: H (A, B, C, and E)
The T wave represents rapid ventricular depolarization. It is during this time that the myocytes regain their resting negative charge. The interval from the S wave to the apex of the T wave is termed the absolute refractory period. During this phase the cells are essentially turned off to external stimuli. Ventricular arrhythmias can be initiated by a premature ventricular complex that falls after the apex of the T wave.

Two characteristics should be noted in regard to the T wave: inversion and peaked appearance. Observe the morphology of the T wave in the normal tracing and compare it with the abnormal T waves in the EKGs and examples. Inverted T waves may represent and old infarction or evolving ischemia. This is because scar tissue alters the route that electricity takes to spread through the heart, changing the appearance of the T wave. T waves that are peaked or depressed may also indicate electrolyte abnormalities. T waves are peaked in hyperkalemia and depressed in hypokalemia usually followed by a U wave.

ANSWER TO QUESTION 6:
Tracing #1: Myocardial Ischemia
Tracing #2: Heart failure
Tracing #3: Manifestation of past MI

ANSWER TO QUESTION 7: Tracing #2 may benefit from interval training (versus continuous training) due to his diagnoses of heart failure.

Questions or comments on this vignette and may be sent to Deirdre.Proudman@lowellgeneral.org.

References
Lowell General Hospital Cardiac Rehabilitation EKG strips used by permission.

T-WAVE MORPHOLOGY:
A refresher on normal T wave morphology as well as reasons for T wave inversions:

Normal EKG waves and intervals

T wave inversions associated with coronary artery disease may result from myocardial ischemia (unstable angina), non ST-segment elevation myocardial infarction (NSTEMI), or previous MI.

Patients with pulmonary embolism (PE) may also demonstrate T wave inversions. Typically shallow in the inferior leads, deeper T inversion attributed to right ventricular strain and massive PE are generally observed in the right to mid precordial leads V1-V4. This is the most specific finding in the PE patient.

Bundle Branch Block (BBB): Leads with large positive QRS complexes will demonstrate T wave inversions. In left BBB, inverted T waves are seen in leads I, aVL, V5, and V6. In right BBB, T waves are inverted in V1 and V2.

With left ventricular hypertrophy, leads with large positive QRS complexes will demonstrate T wave inversions. They exhibit a gradual downsloping with a rapid return to baseline. This is related to LVH pattern, not indicative of ACS.

T wave consistent with sustaining a CNS hemorrhage or ischemic infarction