Earlier this year the Ontario Society for Health and Fitness launched this publication with the goal of fostering better communication amongst front line fitness professionals. In the weeks following the launch, 2 things became very evident.

First, judging by the number of emails and occasional phone calls received offering feedback (both good and bad...) and advice (mostly good...), there is certainly an appetite for a stronger network of communication.

Second, judging by the variety and depth of the articles submitted, there is a vast amount of experience and knowledge amongst OSHF members available to be shared.

In this issue of the OSHF Health and Fitness Bulletin, submissions include a practical discussion on fitness programming for children, one professional’s take on how to apply the evidence on pre- and post-natal fitness, a review of the pros and cons of a controversial ergogenic aid and a backgrounder and case study on exercise and atrial fibrillation.

As always, OSHF H&FB encourages your feedback, commentary, rebuttal or reactions to the opinions, ideas and discussions presented in its articles. If you feel that your experience and expertise can further circulate knowledge about important health and fitness topics, this forum is ideal for doing so.

If you would like to submit an article or inquire about getting your work published and shared with the health and fitness community please see the information on “Submitting an article...” on Page 3.

Lastly, a special thank you to everyone who has contributed to the content of the first two issues and set the standard for many issues to come!
Recommendations for exercise during pregnancy have changed over the years. A few decades ago, women were encouraged to rest and avoid exercise during their pregnancies. We then progressed to the 140 bpm heart rate guidelines which were somewhat restrictive given a higher prenatal resting heart rate. Most women were encouraged to wait until their second trimester to begin an exercises program if they were previously sedentary. The current guidelines are much more realistic and accommodating, though I believe there is room for improvement.

**What the research says...**

Research has proven that exercise during pregnancy can:

* increase energy, strength, endurance and muscular coordination
* reduce swelling, tension, stress and depression
* reduce the likelihood of developing varicose veins, diastasis and stretch marks
* decrease risk of gestational diabetes and excessive maternal weight gain

The American Congress of Obstetricians and Gynecologists (ACOG) recommend the following for exercise during pregnancy:

* 30 minutes of activity on most, if not all days of the week
* Walking, swimming, cycling and aerobics are good choices, even for beginners
* Strength Training, if done in moderation is safe for women who have strength trained before pregnancy
* Sedentary women should begin with 5 minutes of exercise a day and add 5 minutes each week until reaching 30 minutes a day

A note about Diastasis Recti

Diastasis recti is a separation between the left and right side of the rectus abdominis muscle, which covers the front surface of the belly area. Also known as abdominal separation, diastasis recti is a condition where the right and left sides of the rectus abdominus spread apart at the body’s midline. Diastasis negatively affects the strength of the abdominal wall and can contribute to low back pain.

**Recommendations**

The Par-med X for pregnancy provides examples of muscular strengthening exercises and includes abdominal curl ups, head raises lying on side or standing position. Based on my experience, I would not recommend any of these exercises during any trimester. Training the rectus and obliques (as they co-contract with the rectus in forward flexion) should be avoided during all trimesters. As a Kinesiologist, I rarely train the rectus with my clients as I find more emphasis needs to be placed on the posterior chain and deep core muscles. Instead, during the prenatal period, focusing on the transverse abdominus (TVA) and muscles of the pelvic floor will help create a strong deep core without straining the rectus and potentially causing or aggravating diastasis. When diastasis occurs, a strict TVA and pelvic floor training regime will help maintain stability of the pelvis and trunk without compromising the structural integrity of the trunk. Caution should be used when rising from supine - always roll to one side to prevent engaging the rectus abdominus.

There are many changes that take place to a woman’s body during pregnancy. The centre of gravity moves up and out, women may become lordotic, scapular deviations may take place, and swelling may occur in the extremities. A sound prenatal strength program should include:

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**About the author...**

Sarah Zahab BSc., CK, CSEP-CEP is a certified Kinesiologist, Exercise Physiologist, group fitness instructor and former international fitness competitor with over 15 years of fitness industry experience. She is the creator of the Prenatal and Postnatal Strength Workout DVDs available in stores, on her website and on amazon.com. Sarah works in the corporate fitness setting, instructs classes, works one-on-one with a variety of clients and instructs fitness workshops. She is currently expecting her second child.
In the immediate postnatal period, women may begin draw ins, walking

A diastasis check should be performed in the postnatal period before

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• Lower body exercises focusing on the gluteus medius, gluteus maximus, hip abductor group, quadriceps group and hamstrings group

• Trunk exercises focusing on the transverse abdomen and pelvic floor

• Upper body exercises focusing on the lower trapezius, rhomboids, scapular stabilizers, latissimus dorsi, deltoids (especially rear delts), triceps and chest

Definite muscle groups to avoid training during pregnancy would include the rectus abdominus, obliques, and hip adductors group. The hormone relaxin is released during pregnancy which causes ligaments to become lax. Some of the adductors attach in and around the pubic symphysis which becomes less stable during pregnancy. Training the adductors could lead to an adductor muscle pull, pain or discomfort in the pelvic area or an inflammation of the pubic symphysis. Because of relaxin, pregnant women should also stretch with caution.

Post Partum

In the immediate postnatal period, women may begin draw ins, walking and kegels following the birth. Women should check with their primary care giver before beginning an exercise program and should ease into their workouts slowly and listen to their bodies. It is typically fine to begin 6 weeks after a vaginal delivery and 8 weeks after a C-section however the new mother may need more recovery time depending on bleeding, pain, energy levels, fatigue and motivation.

A diastasis check should be performed in the postnatal period before resuming any rectus abdominus or oblique work. When prescribing postnatal workouts, I typically wait 3-6 months before including these muscle groups (however rarely include them). To verify if diastasis has indeed occurred, have your client lie supine with the knees bent, have her elevate her head and shoulders off the floor. Palpate the linea alba - if a gap of more than 2 fingers can be placed in the groove, diastasis has occurred. If the gap is deep, the connective tissue may also be compromised. An ideal groove would be shallow and less than two fingers in width - above and below the navel.

It is difficult to establish an exact timeline for resumption of fitness activities as each body is different and many factors affect recovery time. Prescribing a progressive, transitional, foundation building and time conscious program will help the postnatal individual ease back into exercise safely and effectively. In my experience, including the new baby into workout routines can be very effective and using baby as resistance can be quite rewarding. An emphasis on proper posture should be placed especially with nursing mothers.

References


Submitting an Article...

We want to hear from YOU!

Health and Fitness Bulletin publishes original articles on topics of interest to front line fitness professionals. We invite submissions authored by exercise scientists, fitness professionals, allied health practitioners and community members.

Although it is a peer-moderated publication, it is not intended to be a scientific journal publishing original research findings. The purpose of peer-moderation is to ensure a high quality publication that sets the standard for dialogue in the fitness community.

Submissions will be published under one of the following topic categories:

• Systematic review of a topic
• Clinical exercise physiology
• High performance athletics
• Client/patient’s perspective
• Open communication/hot topics
• Programming/administration
• Program/facility spotlight
• Product/book review
• Case study

All submissions must conform to the criteria established in the Submission Guidelines. Contact hfb@oshf.ca for details.
Practical Advice

Kid’s Fitness: What is the real goal?

In 2011, our society is still entangled within the obesity epidemic. Sedentary lifestyles, lack of education regarding fitness and health, and poor eating habits continue to lead us deeper into this modern day tragedy. Worst yet, we are leading our children in the same unhealthy direction. More and more we are beginning to see fitness programs for kids within fitness clubs and training studios. A parent eagerly trying to get their kid fit and lose weight has become a new niche for Fitness Professionals. With that in mind, what is the real goal when it comes to “training” these younger clients?

Current research has shown that resistance training in children is safe. It is recommended to take place under the guidance of a Fitness Professional in order to teach proper technique, warm up, cool-down, training habits etc. Within this research, 3 points jump off the page and should be closely analyzed by us, the Fitness Professional:

- Include specific exercises that require balance and coordination.
- Professionals should genuinely appreciate the developmental uniqueness of youth and should be able to present information to children and adolescents in a way that is appropriate for their level of understanding.
- Systematically vary the training program over time to optimize gains and reduce boredom. (1)

“Include specific exercises that require balance and coordination.”

Children around the ages of 10-13 are generally experiencing the first phases of puberty (2). This phase in their lives creates an “unstable” environment within their bodies due to the massive amounts of physiological changes. As a trainer, you will quickly notice that proprioception in these children is usually low due to these factors. Incorporating activities that require balance and coordination help the body to develop increased proprioception by recruiting the neural pathways. It has been suggested that improvements in motor skill performance and the coordination of involved muscle groups could be partially responsible for training-induced strength gains in this age range, in addition to the increased proprioception (3). Not to mention, these activities help to increase the child’s confidence in their abilities and ultimately themselves during these physiologically tough times.

Fitness Professionals should remember that training various age groups will require the need to adjust how you listen and teach the client. Training a 30 year old is different than training a 9 year. They can be taught similar aspects, but how you teach them becomes increasingly important. For example, a 9 year old does not care what a pushup can do for them, or how lunges will help create greater overall stability and lower body strength. A 9 year old cares about 2 things; 1) if they can do it ... and; 2) how many they can do. It’s a game to them and therefore it should be presented as such. Create a method that is exciting and fun for them, yet still focuses on proper technique points, so the child will grow up enjoying fitness. A 9 year old’s attention span can be vastly different than that of an adult client. Be more relaxed how you, the professional, can accomplish the targeted task but perhaps in a way that is more appealing to your young client. Kids naturally develop confidence and physical improvements by experimenting; just as we all did back in the old days of playing on the playground and climbing trees.

As with any client, a Fitness Professional must ensure a gradually varying program design to force adaption within the body, in order to produce results. With children, this is also the case however the most important part of this point, is the latter; to reduce boredom. ACSM states that approximately 50% of clients will stop their current routine within the first year (4). A few reasons are attributed to this drop off, with one being “bored of their routine”. Kids are kids. As a Fitness Professional we need to teach the fun that comes with living active lifestyle. Training a child is not necessarily teaching them that they must go to a gym for the rest of their life. It is to teach them the importance of a healthy and active lifestyle, and how enjoyable it can be.

What is the real goal?

Ultimately, kid’s fitness needs to be fun. Incorporating fun methods of teaching strength, flexibility, balance, agility etc... will keep them wanting more. By doing so, as Fitness Professionals we can incorporate great lessons on healthy lifestyle simply by doing what kids love to do; playing. Don’t weigh them every couple weeks or focus on inches and pounds even if the parents are hoping for weight loss in their child. Approach it from a different angle; the fun angle. Create challenges and games for the young clients, involve the parents in healthy eating habits and in some home activities. In the end, this will produce the desired results but with a new found excitement within your young client for fitness and their health.

About the author...

Derek Arsenault, CSEP-CPT is a graduate of the Fitness & Health Promotion program at, Loyalist College in, Belleville, ON. He works as a Personal Trainer and Conditioning Coach to a large number of athletes, general clientele and children on a day-to-day basis. His work at ONE TO ONE Health & Fitness Centre, in Belleville, ON surrounds his passion for sport and play.

References:
Atrial Fibrillation: What is it and why do I care?

What is Atrial Fibrillation?

AF is effectively a condition in which the cells in the upper chambers of the heart become more effective at pumping blood to the lungs and rest of the body. This means that the heart does not have to work as hard, which can lead to a decrease in exercise performance.

Coupled with the feelings of anxiousness stemming from the high heart rates, this can cause feelings of fatigue, shortness of breath and decreased exercise performance.

This may be chronic, lasting indefinitely, or intermittent, lasting for a few hours to a few days with days, weeks or months between bouts.

There are two major consequences of this activity. First, without any active contraction of the atria, blood that is normally pumped through that part of the heart only passively flows in to the ventricles to be pumped to the rest of the body. This means that the ventricles are not ‘preloaded’ with as much blood and are thus less efficient.

Second, since the ventricles rely on electrical signaling from the atria, the random signals coming through the atrioventricular node result in an ‘irregularly irregular’ heart rate, which may at times be inappropriately fast or slow.

Patients with AF are generally aware of their condition. They are often on several medications to control their high heart rates. This may include digoxin, beta blockers or calcium channel blockers. In addition, antiarrhythmic agents such as amiodarone work well to minimize the random electrical activity. AF patients are also typically on some form of anticoagulation therapy, typically either high dose aspirin or warfarin, to minimize the risk of strokes and other thromboses.

Exercise is not appropriate for a patient experiencing uncontrolled atrial fibrillation.

What should I do differently for someone with Atrial Fibrillation?

The first and most obvious implication is that someone whose heart rhythm is ‘irregularly irregular’ would not be able to use heart rate monitors as a measure of exercise intensity. In fact, most heart rate monitors will not be able to display a heart rate, and palpating the radial or carotid arteries result in irregularities in both the strength and rhythm of the pulse. Instead, it is recommended that intensity be measured using a perceived exertion scale (6 to 7 out of 10) or at a rate that allows for an increase in breathing without compromising their ability to carry on a conversation.

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Case Study: Exercise and Atrial Fibrillation

Age  | Gender | Height | Weight | Rest HR | Peak HR | Peak VO₂
--- | --- | --- | --- | --- | --- | ---
55 yrs | Male | 185 cm | 87.1 kg | 55-85 bpm | 158 bpm | 37.9 ml/kg/min

Notes
Paroxysmal (intermittent) atrial fibrillation for past 3 years

Medications
ASA 325 mg, Bisoprolol 2.5 mg, Norvasc 5 mg, Lipitor 10 mg

Clinical assessment
Patient has been on the above medical therapy for paroxysmal atrial fibrillation for 3 years. His episodes typically occur every 3 to 5 days, lasting from 3 to 48 hours. Heart rates are well controlled, although he does feel anxious and sluggish during his episodes.

Under his physician’s advice, he has recently started a regular fitness program. He goes to the gym 3 or 4 times per week. He runs for 20 to 30 minutes at 5.0 to 5.5 mph, which he rates at a 6 or 7 out of 10. He then carries out a balanced resistance training program consisting of 3 or 4 sets of 10 to 12 repetitions of each exercise. He uses a combination of free weights and machines, and in between exercises he uses high intensity intervals where he skips rope, jogs on the spot or uses a rowing machine for 5 minutes to keep his heart rate up.

He has noticed that the duration and intensity of his symptoms has decreased, but seems to coincide with his workouts, occurring 3 to 4 hours after he leaves the gym and lasting for about 3 to 12 hours.

He states no change in diet, sleep or social history.

Interpretation
The aerobic portion of his exercise routine is appropriate.

The resistance training portion of his program is appropriate.

The cardiovascular intervals in between his resistance exercise are placing undue stress on his myocardium. The general fatigue from 20 to 30 minutes of running, systemic accumulation of lactic acid and increased intrathoracic pressure from the resistance training and the relatively high cardiovascular demand of the skipping or rowing significantly increase the sympathetic nervous activity in the body. This over-stimulation of adrenergic pathways is known to precipitate paroxysmal arrhythmias.

Recommendations
Continue with the described activity, but omit the cardiovascular intervals between resistance training activities.

3 month follow up
Patient reports a subjective decrease in episode frequency, as well as a marked decrease in symptoms of fatigue and shortness of breath. Patient has lost 4 kg (-5.2%) and increased peak VO₂ by 3.8 ml/kg/min (+ 9.9%)
Most of us have probably seen or at least heard of people taking breaths from bottled oxygen for better performance during a workout. A common (and even necessary) factor in performing at extreme altitudes, the practice has started to make its way down to sea level, into gyms and training facilities.

The internet is full of companies selling bottles of hyperoxic gas mixtures (typically in the 40-60% oxygen range) with claims of “instant energy” and “keeping you aerobic”. But are any of these claims substantiated by well conducted scientific studies, and do they even have a scientific basis?

To answer, first, let’s review some basic oxygen transport physiology. Oxygen is transported in the blood in two ways, bound to haemoglobin and dissolved in the plasma. The amount of oxygen bound to haemoglobin is governed by the partial pressure of oxygen (P\text{O}_2) in the arterial blood. Healthy people at sea level have a P\text{O}_2 of ~100 mmHg, resulting in essentially full saturation of their haemoglobin with oxygen. Healthy men have ~16 g of haemoglobin per 100 mL of blood and each gram of haemoglobin can bind 1.34 mL of oxygen, therefore the haemoglobin portion of total oxygen content in blood is ~21 mL/100 mL. If the P\text{O}_2 were to decrease, by inhaling hyperoxic gas, then the haemoglobin saturation would decrease and oxygen content of the blood would decrease. Breathing hyperoxic gas will increase P\text{O}_2, but will not result in any more oxygen being bound to haemoglobin; which is already fully saturated. If haemoglobin is fully saturated, then breathing bottled oxygen cannot increase oxygen transport and consequently will not improve performance.

Oxygen is also transported through plasma. The amount of oxygen dissolved in plasma is described by Henry’s Law: it is directly proportional to oxygen partial pressure at the air-liquid interface and the molecules solubility. Oxygen has a very low solubility in plasma, around 0.003 mL/100 mL of blood for every 1 mmHg P\text{O}_2. Therefore, 100 mL of blood at a normal P\text{O}_2 will have 0.3 mL of oxygen dissolved in the plasma; the addition of the haemoglobin content and the dissolved content gives a total oxygen content of 21.3 mL/100 mL of blood. Doubling the P\text{O}_2 would only increase the oxygen content by 0.3 mL/100 mL, or a 1.5% increase. Thereby, even breathing gas with very high oxygen concentration (for example, above 50%), there is still less than a 5% increase in the total oxygen content. In addition, oxygen is not readily stored in the body; therefore upon cessation of hyperoxic breathing any possible increase in oxygen content would be lost within seconds.

During all levels of exercise, most healthy humans maintain P\text{O}_2 near resting levels, indicating their oxygen content is not decreasing. Promoters of hyperoxic gas breathing may point out the phenomenon of exercise induced arterial hypoxemia (EIAH). This is an intriguing phenomenon that has been well documented in healthy men who show a decrease in their P\text{O}_2 during aerobic exercise (1). Moreover, if the hypoxemia is reversed by inspiring hyperoxic gas, exercise duration and work-rate can be increased (2). However, this important exception cannot be seen as proof for the efficacy of breathing hyperoxic gas. First, EIAH occurs in only a small fraction of the general population (~ 50% of highly fit men (VO\text{max}>75mL/kg'/min')); the prevalence in women is more controversial (3,4). Second, EIAH occurs during the bout of exercise and does not persist long after the cessation of exercise (5). Finally, there does not appear to be any carry over effect of EIAH on subsequent exercise bouts (5). In other words, developing EIAH in one exercise bout will not cause a worsening of hypoxemia in a subsequent exercise bout of similar intensity (5). Therefore, while there may be some ergogenic effect of hyperoxic gas during an acute bout of exercise, there is no indication that it will help in preparation or in recovery. Besides, carrying around a tank of oxygen is horribly impractical and the added weight would counteract performance gain.

Despite this apparent physiologic futility, the use of hyperoxic gas is rampant in the professional sporting realm. Many National Football League players can be seen breathing hyperoxic gas on the sidelines after a long run, and some mixed martial artists can be seen doing the same before a fight. I fully believe that these athletes “feel” better after breathing the gas, but I attribute this purely to a powerful placebo effect (6). I have no issue with professional athletes using hyperoxic gas. They are simply trying to gain a competitive edge. Since a few breaths do not hurt the athletes, there seems to be little risk for this psychological benefit. However, the issue is different when breathing hyperoxic gas starts to appear in the personal training/health and fitness domain. As fitness experts, our primary role is to help our clients live healthier and more active lives. The first step in helping our clients achieve this should be to educate them on how they can attain their goals. Educating our clients should be based on sound scientific evidence, rather than common misconceptions. It would be inappropriate to allow our clients to continue to use an “aid” that does nothing but waste their money and distracts them from effective and efficient training methods.

About the authors...

Paolo B. Dominelli, B.H.K., M.Sc. (c.)

Glen E. Foster, B.H.K., M.Sc., Ph.D.

Both authors are currently members of the Health and Integrative Physiology Laboratory in the School of Human Kinetics at the University of British Columbia. Their research includes sex-differences in pulmonary gas exchange and transport, and the cardiovascular and respiratory adaptations that take place at high altitude.

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