THE INTERNATIONAL HYPERBARICS ASSOCIATION, INC.

The Pressure Point

Volume 7
Issue 10 October 2006

HYPERBARIC HEALING IN THE SPORTS WORLD

Morgan takes the hyperbaric approach

The Carolina Panthers, tipped by many as Super Bowl contenders, will be without middle linebacker Dan Morgan, seen here in August 2006, for their game at Minnesota. Morgan suffered a concussion in the Panther's season-opening defeat by Atlanta.

Jul. 29, 2006 (KRT News delivered by Newstex) -- SPARTANBURG, S.C. --

For the first time in his NFL career, Carolina Panthers middle linebacker Dan Morgan doesn't have a training camp roommate.

But Morgan has less space in his Wofford College dorm room than ever. Instead of rooming with Will Witherspoon, he's sharing space with a portable hyperbaric chamber.

"Any bumps, bruises, strains, muscle pulls... it helps you recover quicker from those kinds of things"

With best friend Witherspoon signing as a free agent with the St. Louis Rams, Morgan finally took advantage of his right as a veteran to have room for himself.

He has come to rely on the chamber as much as he did on Witherspoon, who spent the last four years lining up next to him.

Morgan said he decided to try the chamber, which is designed to bring more oxygen into the blood stream and speed recovery, after conversations with agent Drew Rosenhaus. Wide receiver Terrell Owens, another Rosenhaus client, brought attention to hyperbaric chambers when he used one to during his recovery from a broken ankle two

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Inside this issue:

Ask the Doc

Answers for Hyperbaric Inquiries

Q: Is hyperbaric Oxygen alone better than a non-rebreather, or a hood?

A: Regarding your question of the amount of soluble oxygen available in the tissues when exposed to 100% oxygen with a non-rebreather mask versus hyperbaric oxygen at 1.3 ATA at room-air, here is my response.

In my search of the currently available literature, I acquired most the following data from Dr. Bartlett's work. Dr. Bartlett is the pioneer of ECMO, or extracorporeal oxygenation, and though a surgeon, he is an expert pulmonologist.

In patients with a normal alveolar-arterial gradient, (the barrier between blood and air in the lungs, affected by many pulmonary conditions, such as lung collapse, pneumonia, pulmonary hypertension, ARDS, etc.), it can be assumed that the concentration of oxygen diffused in plasma is directly proportional to the alveolar oxygen; that is, that there is no barrier, or very minimal, to the diffusion of oxygen from the alveoli to the pulmonary capillaries, and beyond. In these patients, then:

$PAO2 = (FiO2 \times (760-47)) - (PaCO2/0.8)$

Where PAO2= Partial Pressure of Alveolar Oxygen

- FiO2 = Fraction of Inspired Oxygen
- PaCO2 = Partial arterial Pressure of Carbon Dioxide

(Continued on page 3)

The Effect of Hyperbaric Oxygen on Scleroderma

A Case Report.

Gianna Scannell, MD
Aspen Hyperbarics

Background: Scleroderma is an autoimmune condition in which collagen deposits in abnormally high concentration in the subcutaneous tissue and other areas of the body. In some cases, this restricts blood supply to the skin and prevents normal wound healing. Wounds fester and become infected, decreasing oxygen delivery even further.

Hyperbaric oxygen delivers oxygen to ischemic, marginal wounds and is known to accelerate wound healing by as much as 50%. Additionally, hyperbaric oxygen is an immunomodulator, which decreases the production of ICAM and Tumor Necrosis Factor alpha by vascular endothelial cells and neutrophils (Refs 1,2,3,4,5).

Study Design: A 50 year-old white female ceramic artist with diffuse scleroderma for 10 years was referred to our Institution for evaluation of more than 10 open wounds in both her upper extremities, present for at least 6 months, and refractory to every conventional therapy.

A 46 year-old white male trumpet player with cutaneous scleroderma for 7 years was referred to our Institution for symptoms of Raynaud and ulcers on his fingertips lasting the entire winter season, associated with numness in his fingers on both hands.

Each patient was given 50 consecutive 90 min. sessions of Hyperbaric Oxygen with a mild hyperbaric chamber at 1.3 ATA.

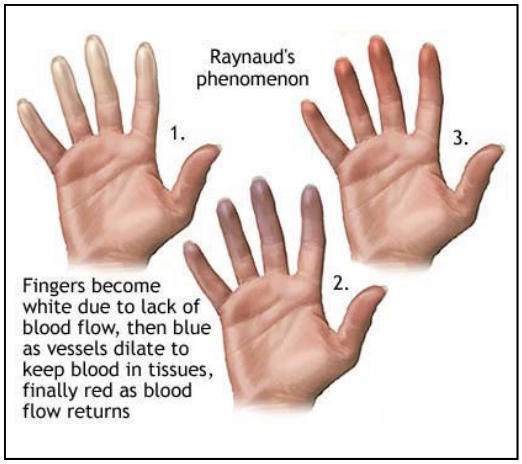
Results: In both cases, initial oxygen saturation readings were not obtainable in any of the fingers, which were pale and insensate. Both patients had 5 to 10 episodes of Raynaud per day. No change was observed during the first 10 treatments.

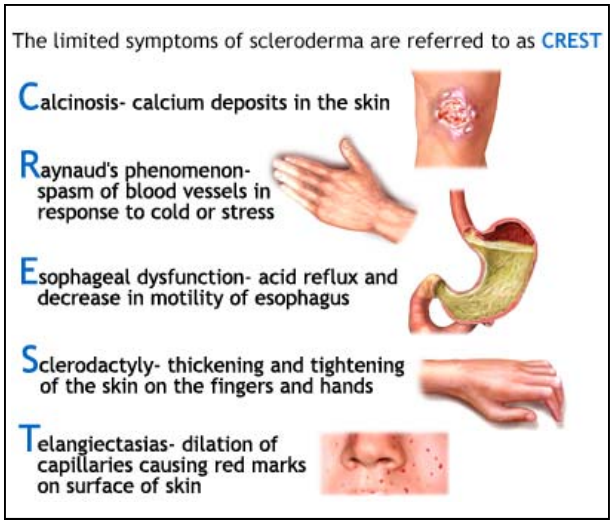
After the 20th, it was observed that the episodes of Raynaud, which had been decreasing, had completely abated. Oxygen saturation readings became obtainable and improved slowly. At 30 treatments, both patients showed definite evidence of healing their wounds. Additionally, sensation returned to the tip of their fingers. At 40 treatments, their pulse oxymeter readings were consistently 98% in all fingers, and there was a dramatic progress in wound healing. Therapy was stopped at 50 sessions.

Approximately a year after hyperbaric oxygen therapy was discontinued, wounds remained healed and pulse oxymeter readings continued to be 98%, suggesting that new capillary growth had been permanently achieved. New wounds did not get infected and healed rapidly.

Though before their treatments, both patients had experienced a slow progression of their disease, no new symptoms had appeared. In fact, there appeared to be a regression in the amount of deposited collagen.

Conclusions: Although scleroderma is not an approved indication for hyperbaric oxygen therapy, the ischemia it causes can be combated by hyperbaric oxygen. The diffusion of oxygen in areas of the body, ischemic because of scleroderma, may change the number and distribution of capillaries in these areas, thus allowing healing. Additionally, hyperbaric oxygen may ameliorate this debilitating chronic autoimmune condition.





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HYPERBARIC HEALING IN THE SPORTS WORLD (CONTINUED)

seasons ago.

Morgan wasn't injured as he began his seventh camp with the Panthers on Saturday, but he's taking a proactive approach. His career has been filled with injuries, and he's never started 16 games in a season.

"Every article you see or whatever, it's, `He's a great player, but . . .,'" Morgan said. "Obviously, I'd like to erase that from my past, but I can't erase it. I take it as a man. I know what's happened to me in the past. I just come out and work hard. I've done a lot of things this off-season that I think are going to help me stay healthy. I think they're going to make me a better player and a more healthy person."

That's why Morgan spent about $20,000 to buy the chamber early in the off-season. He said the chamber allowed him to work out harder than he ever has in the off-season and he believes it will help keep him fresh and on the field for the regular season.

"Since I've used it, I've really felt better," Morgan said. "I can notice the difference just in the way your body feels and the way you recover from workouts and soreness."

But it took some getting used to. The chamber, which simulates conditions below sea level, takes up about half of Morgan's room.

"You get in and zip it up, and it almost feels like when you're taking off in a plane," Morgan said. "Your ears pop. That's kind of what it does at first."

But Morgan adjusted quickly and said he's noticed big benefits from spending about an hour a day in the chamber.

"Any bumps, bruises, strains, muscle pulls it helps you recover quicker from those kinds of things," Morgan said.

More than ever, the Panthers need Morgan to recover quickly from injuries.

Witherspoon's departure created one opening at weak side linebacker, and strong side linebacker Brandon Short was released shortly after last season.

Ask the Doc: Answers for Hyperbaric Inquiries

(Continued from page 1)

Here are the results for 4 conditions:

1. Room-air PAO2 =117.73 mmHg
2. 100% O2 by non-rebreather mask PAO2 (60% to the alveoli) = 395.80 mmHg
3. Room-air 1.3 ATA PAO2 = 162.65 mmHg
4. 100% O2 by mask non-rebreather PAO2 (60% to the alveoli) = 524.14 mmHg

This confirms the argument for placing a patient with a normal A-a gradient on a non-rebreather mask for 90 min every day delivers to the body a larger amount of oxygen than a mild hyperbaric chamber alone, if the treatments are equal in length of time, temperature, serum electrolytes, and body metabolic rate.

But is this all there is?

This equation assumes that the A-a gradient is normal, that patients are all healthy, and most of all it discounts the importance of pressure alone.

Over the last five years, it has become clear the hyperoxia is not the same as hyperbaric oxygen. Hyperbaric oxygen also decreases release of inflammatory mediators, while hyperoxia does not.

I quote two articles I came across recently, both in PUBMED:

1. Chu SJ, Li MH, Hsu CW, et al: Influence of hyperbaric oxygen on tumor necrosis factor-alpha and nitric oxide production in endotoxin-induced acute lung injury in rats. Pulm. Pharmacol. Ther. 2006 Sep 9, page numbers pending.

In this article, the authors show that HBO but not hyperoxia attenuated the TNF-alpha and NO concentration in bronchoalveolar lavage AND plasma in lipopolysaccharide-induced injury.

2. Veltkamp R, Siebing DA, Sun L, et al. Hyperbaric oxygen reduces blood-brain barrier damage and edema after transient focal cerebral ischemia. Stroke 2005 Aug;36(8):1679-83. In this article, 100% oxygen or room air oxygen did not achieve reduction in post-ischemic blood brain barrier permeability, while HBO did.

We at *Aspen Hyperbaric* have used our mild hyperbaric chamber, a Vitaeris 320, along with 86 to 91% oxygen delivered via an oxygen concentrator, and we have recommended this approach to others. This was based upon our own and the above data, where alveolar oxygen concentrations are indeed increased, and the fact that we have had no complications from oxygen toxicity, but resolution or significant improvement of a number of infectious, autoimmune, or hypoxic conditions for which at present there is little or no treatment.

—Gianna Scannell, MD, FACS, DMO

Aspen Hyperbarics, Colorado

In the News:

A little help from my friends

Anonymous group helps woman cope with disease

Su Simmons demonstrates the use of her hyperbaric chamber Friday afternoon. A group of her family and friends bought the device, which helps relieve her scleroderma. (Paul Conrad/The Aspen Times)

By John Colson
The Aspen Times

June 28, 2006

Su Simmons was living the Aspen lifestyle until one day in the early 1990s when her life suddenly took a hard turn.

Simmons, 53, was a single, working-class woman who was active in the local social scene, as well as an avid runner and hiker. Now she deals with scleroderma, a life-threatening illness that has robbed her of the ability to work or do many simple daily tasks.

Nevertheless, she carries immense gratitude for the help and support of a broad circle of friends and family, who, in addition to their constant affection and friendship, have helped financially. An "anonymous" group of friends pays for her increasingly costly regimen of medications and the recent purchase of an expensive hyperbaric chamber.

"She is just the light of our life," said Lisa Amador Dimento, a teacher who manages the Alpine Bank account that is used to pay Simmons' expenses. Dimento added that Simmons has always been "fiercely independent. She wouldn't let us do a benefit for her."

Dimento said the benefactors, who call themselves the Donor Anonymous Group and now number about 65, bought the $18,000 hyperbaric chamber last year.

"It's just been an incredible outpouring of love and support," she said, and there is now probably several thousand dollars in the bank account.

Simmons doesn't know the names of her other benefactors, although she said slyly, "I have some ideas." But she knows that the hyperbaric chamber, which raises atmospheric air pressure within the chamber and "takes me down to sea level," has increased her oxygen intake, improved blood flow to her capillaries and relieved her symptoms. It may prolong her life, as well.

She first discovered the benefits of the hyperbaric chamber when she met two local doctors, Dennis and Gianna Schannel, who gave her free treatments in their chamber in 2002 to fight off a staph infection. But the Schannels moved away, and until Simmons' family and the group purchased a machine last year, the closest one was in Denver.

"My friends have been so supportive," she said softly.

Since moving to Aspen in the mid-1970s, Simmons has worked a variety of jobs, including a number of years at The Aspen Times when it was published once a week. Many know her as one of the most unquenchably cheerful and sweet-tempered people. Those traits earned her the nickname "Sweet Sue."

Suddenly overcome

In 1993 she began feeling tired and out of sorts, despite carrying on an active lifestyle.

"I'd never been sick a day in my life," she said. One year earlier she ran a marathon in St. George, Utah. She was training to run the race again when an immense fatigue overcame her and she had to stop running.

"I just couldn't get going," she said. "I was very tired ... I was really, really sick," and making it to the couch after doing a little housework was a difficult chore.

Her extremities became painful and started to swell, and doctors diagnosed carpal tunnel syndrome.

In 1994 she underwent surgery, which was so stressful it "just sent me into outer space with the scleroderma," she said. "Within six months, I couldn't walk."

When doctors diagnosed scleroderma, they said it could kill her within three to five years. But the swelling subsided. These days, the severity of the disease seems to ebb and flow. She lives with the threat of a severe recurrence.

The name of the disease comes from two Greek root words - sclero, meaning hard, and derma, meaning skin - according to the Scleroderma Foundation.

Over the years, she spent her entire savings after her insurance company, Travelers, canceled her policy in 1995. Her parents now help with living expenses, and the group account provides money for medicine and other expenses every month.

Ravaged by disease

Simmons' appearance has changed dramatically in a decade and a half.

The most noticeable effect is how her skin seems tightly drawn over emaciated muscles and bones on her face and arms and is tougher and more brittle than it would normally be. And sometimes she will develop open sores on her arms from infections.

"It feels like my arms are burning, the bones are burning, from the inside out," she said, although lately the pain has "lightened up" thanks to her medicine, the chamber and time.

Her hands are gnarled and shrunken, although until recently only one hand was severely affected and she was able to accomplish her daily tasks, from gardening to making clay platters and other pieces. She was selling her pieces in art shows around the U.S. and even in Japan.

A recent flare-up of her illness has put at least a temporary hold to her budding career in commercial pottery. She cannot work in her garden either be-

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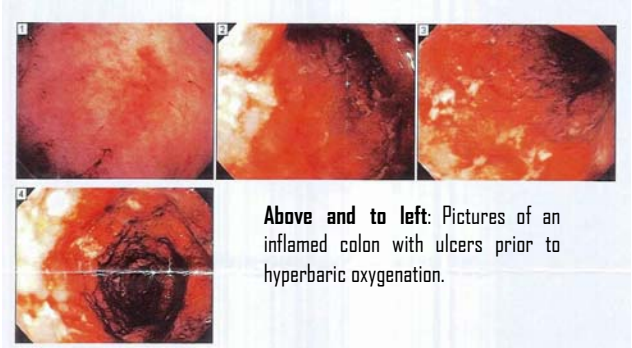
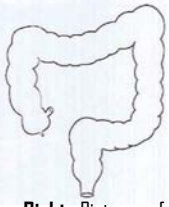
Ulcerative Colitis: in remission with Hyperbaric Oxygen

A Case Report.

Gianna Scannell, MD
Aspen Hyperbarics



Above and to left: Pictures of an inflamed colon with ulcers prior to hyperbaric oxygenation.



Right:: Pictures of a normal colon. With hyperbaric oxygenation, Dr. Scannell has seen wonderful improvement in the healing of ulcers and the reduction of inflammation.

Foreword: Inflammatory diseases of the bowel start with abdominal cramps, bloody diarrhea in bouts of five to ten per day, affect predominantly young people, as early as 8 years old, and devastate their lives. Though surgical resection of the affected bowel is possible, and frequently done for chronic ulcerative colitis, this is by no means the end of the patient's surgical journey. Complications such as infections or disruption of the surgically constructed reservoir which now stands between the small bowel and the anus are not uncommon, as well as adhesions, that cause obstruction.

The best therapy is to avoid surgery altogether, but this is not always possible, and it frequently requires high power immunosuppressive drugs, such as Prednisone and 6-mercaptopurine, a cancer drug, the antimetabolite mentioned in one of our two cases.

Crohn's Disease, the other inflammatory condition, affects the entire thickness of the small bowel, thus causing strictures and fistulae. Other common complications include perforation, peritonitis, and involvement of the rectum and anus.

It is easy to see therefore, that an alternative therapy, a therapy which doesn't wreck the body's immunity, strength, and sense of well being, but in fact restores them, is ideal. Hyperbaric Oxygen Therapy may be such therapy.

A Case Report

Background: Ulcerative colitis (UC) affects 1.2 million people in the USA, mostly teen-agers to young adults. It is a disease in which the last 3 feet of our bowel, the colon, lose their inner layer, the mucosa. Inflammation, or cryptitis, of the budding portion of the mucosa, is a hallmark of the disease.

Mayor complications are sclerosing cholangitis, which leads to liver failure necessitating transplant, and colon cancer. Its cause is unknown. Hyperbaric oxygen, by decreasing inflammation and promoting healing, could improve this condition.

Case Report: A 30 year-old white male, diagnosed with UC seven years prior to his hyperbaric treatment, was referred to our Institution. He had failed every therapy, and was on 40 mg of prednisone a day. In spite of it, he was having 7-9 bloody bowel movements a day, and was confined to his house, disabled, not being able to maintain employment. He underwent 45 sessions of HBO at 1.3 ATA, 120 min twice a day, in his own home.

Results: No improvement was seen for the first 15 sessions. By the 20th, bleeding subsided. By the 30th, the number of bowel movements was reduced to 2 per day. By the 40th, the stool was solid, without blood.

Patient's stool leukocyte count (2,3) was improved (3-5/hpf), suffesting decreased inflammation. Liver function tests revealed a 35% decrease in alkaline phosphatase (280 to 182) suggesting an improvement of his sclerosing cholangitis.

The patient could leave his house for the first time in years, and is tapering his steroids.

Conclusions: Mild HBO is effective in the treatment of Ulcerative Colitis. Inflammation is reduced, or, as in our case, truncated.

A Placebo Controlled Trial of the Clinical Effects of Hyperbaric Therapy in Autistic Children

This study is currently recruiting patients.

Verified by International Hyperbarics Association June 2006

Sponsored by: International Hyperbarics Association
Information provided by: International Hyperbarics Association
ClinicalTrials.gov Identifier: NCT00335790

Condition: Autism; ***Intervention***: Procedure, Hyperbaric Therapy-MedlinePlus related topics: Autism

Purpose

Autism is a neurodevelopmental disorder currently affecting as many as 1 out of 166 children in the United States. Autism is considered by many to be a permanent condition with little hope for improvement. Treatment for autism is centered on special schooling and behavioral therapy; medical science currently has little to offer. Recent research has discovered that some autistic individuals have decreased blood flow to the brain, evidence of gastrointestinal and brain inflammation, increased markers of oxidative stress, and a relative mitochondrial dysfunction. Hyperbaric oxygen therapy (HBOT) can compensate for decreased blood flow by increasing the oxygen content of plasma and body tissues and can even normalize oxygen levels in ischemic tissue. In addition, animal studies have shown that HBOT has potent anti-inflammatory effects and reduces oxidative stress. Furthermore, recent evidence demonstrates that HBOT increases the production of mitochondria and mobilizes stem cells from human bone marrow, which may aid recovery in neurodegenerative diseases. Based upon these findings, it is hypothesized that HBOT will improve symptoms in autistic individuals.

Our recent retrospective case series demonstrated that HBOT may improve symptoms in autistic children. We recently completed a prospective pilot trial using HBOT in 18 children which demonstrated significant clinical improvements in autistic children on several standardized scales. Most of the scales were parent-rated, although some were rated by teachers. However, parents were not blinded to the fact that their children received HBOT and evaluation of the children was through parent-rated scales, either of which could lead to bias. There was no placebo or control group. Therefore, the improvements found in this prospective study could have been due merely to chance or the natural development of the children. To determine if HBOT improves symptoms in autistic children, a double-blind placebo controlled study is needed.

Study Type: Interventional
Study Design: Treatment, Randomized, Double-Blind, Placebo Control, Parallel Assignment, Efficacy Study

Official Title: A Prospective, Randomized, Double-Blind, Placebo Controlled Study on the Clinical Effects of Hyperbaric Therapy in Autistic Children

Further study details as provided by International Hyperbarics Association:

Primary Outcomes: Blinded Therapist Autism Diagnostic Observation Schedule (ADOS); Blinded Therapist Aberrant Behavior Checklist (ABC-C); Blinded Physician Clinical Global Impression Severity Score (CGI); Parental Autism Treatment Evaluation Checklist (ATEC) Expected Total Enrollment: 60

Study start: June 2006

Autism is a neurodevelopmental disorder currently affecting as many as 1 out of 166 children in the United States. Autism is considered by many to be a permanent, static condition with little hope for improvement. Treatment for autism is centered on special schooling and behavioral therapy; medical science currently has little to offer. Recent research has discovered that some autistic individuals have decreased cerebral perfusion, evidence of gastrointestinal and neuro-inflammation, increased markers of oxidative stress, and a relative mitochondrial dysfunction. Multiple independent single photon emission computed tomography (SPECT) and positron emission tomography (PET) research studies have revealed hypoperfusion to several areas of the autistic brain, most notably the temporal regions and areas specifically related to language comprehension and auditory processing. Several studies show that diminished blood flow to these areas correlates with many of the clinical features associated with autism including repetitive, self-stimulatory and stereotypical behaviors, and impairments in communication, sensory perception, and social interaction. Hyperbaric oxygen therapy (HBOT) has been used with clinical success in several cerebral hypoperfusion syndromes including cerebral palsy, fetal alcohol syndrome, closed head injury, and stroke. HBOT can compensate for decreased blood flow by increasing the oxygen content of plasma and body tissues and can even normalize oxygen levels in ischemic tissue. In addition, animal studies have shown that HBOT has potent anti-inflammatory effects and reduces oxidative stress. Furthermore, recent evidence demonstrates that HBOT increases the production of mitochondria and mobilizes stem cells from human bone marrow, which may aid recovery in neurodegenerative diseases. Based upon these findings, it is hypothesized that HBOT will improve symptoms in autistic individuals.

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Eligibility

Ages Eligible for Study: 2 Years - 7 Years, Genders Eligible for Study: Both

Criteria

Inclusion Criteria:

- DSM-IV diagnosis of Autistic Disorder, confirmed with Autism Diagnostic Observation Schedule (ADOS) and Autism Diagnostic Interview-Revised (ADI-R)
- HBOT naïve

Exclusion Criteria:

- DSM-IV diagnosis of Pervasive Developmental Disorder other than Autistic Disorder including PDD-NOS (Pervasive Developmental Disorder, not otherwise specified) and Asperger's Syndrome
- Uncontrolled seizures
- Ear infection
- Uncontrolled asthma
- Inability to equalize ear pressure
- Fragile X syndrome
- Current therapy consisting of chelation

Location and Contact Information

Please refer to this study by ClinicalTrials.gov identifier NCT00335790

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Study chairs or principal investigators

Daniel A Rossignol, MD, Principal Investigator, University of Virginia

More Information

Study ID Numbers: HBA-2
Last Updated: June 9, 2006
Record first received: June 9, 2006
ClinicalTrials.gov Identifier: NCT00335790
Health Authority: United States: Institutional Review Board
ClinicalTrials.gov processed this record on 2006-10-18

Ulcerative Colitis: Case Report

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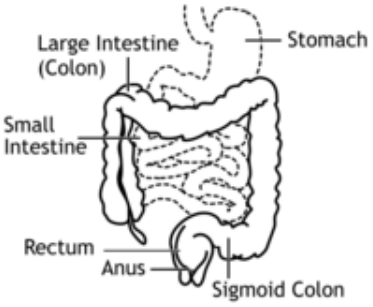

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3. Hanauer S. Update on the Etiology, Pathogenesis and Diagnosis of Ulcerative Colitis. Nat Clin Pract Gastroenterol Hepatol.2004;1(1):26-31.

Did you know?

About 5 percent of people with ulcerative colitis develop colon cancer. The risk of cancer increases with the duration of the disease and how much the colon has been damaged. For example, if only the lower colon and rectum are involved, the risk of cancer is no higher than normal. However, if the entire colon is involved, the risk of cancer may be as much as 32 times the normal rate.

Sometimes precancerous changes occur in the cells lining the colon. These changes are called "dysplasia." People who have dysplasia are more likely to develop cancer than those who do not. Doctors look for signs of dysplasia when doing a colonoscopy or sigmoidoscopy and when examining tissue removed during these tests.

"Mundo vitam dare"

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The International Hyperbarics Association, Inc., is a coalition of doctors, parents, patients, corporate chamber-industry professionals, hyperbaric center owners, and above all members who are committed to the cause of medical hyperbarics.

Our members come to us from all geographical areas with one common goal— to share their knowledge and information regarding the latest hyperbaric news. Our driving force is our members, who are committed to do all we can "to give life to the world."

— "Mundo vitam dare"

A Little Help from my Friends (continued)

(Continued from page 4)

cause small "holes" in her skin allow bacteria to invade her system. Friends now show up to weed, do a little landscaping or whatever else is needed.

"I've thought of taking up painting," she said brightly during an interview at her home, which was built as part of the local affordable housing program and later modified to meet her disability requirements.

Although scleroderma is becoming better known, it has yet to receive the kind of attention as such diseases as multiple sclerosis. Simmons said there is at least one other local who has the disease, and perhaps two, but they tend to be reclusive because of the physical deformities they suffer and the fatigue that saps their strength.

Simmons said recently that, while it is frightening to be speaking publicly about her illness, it is important to reach out to others with the same malady and encourage them to be more open and involved.

"Awareness, that's the key," she said.

Anyone interested in joining the Donor Anonymous Group can send a check to Alpine Bank account DAG No. 20213022175, or mail a check made out to DAG-FBO Su Simmons, in care of Lisa Amador Dimento, P.O. Box 969, Basalt, CO 81612

HYPERBARIC HEALING IN THE SPORTS WORLD

Morgan takes the hyperbaric approach

(Continued from page 3)

Thomas Davis, last year's first-round draft pick, is the likely starter on the strong side. He's loaded with athletic ability, but there's likely to be some transition because Davis played safety in college. The team brought in free agents Na'il Diggs and Keith Adams and drafted James Alexander in the third round. Those three will compete for playing time on the weak side.

That's likely to put more pressure on Morgan. He's still in frequent contact with Witherspoon but said it's time to move on with new people, and more oxygen, around him.

"They're my new teammates," Morgan said. "I'm not going to look back and think of Will. I wish he was here, but that's the NFL. That's the business that we're in, and things aren't always going to stay the same. You've got to deal with what you've got to deal with."