

THE FDA
APPROVED
HBOT
INDICATIONS IN
VETERINARY
MEDICINE AND
BEYOND...

presented by

Andrew Turkell, DVM, CVA, CCRT, CHT-V



DISCLOSURE STATEMENT

I have affiliations with Calusa Veterinary Emergency & Hyperbaric Center and Hyperbaric Veterinary Medicine (hvm)

I have no affiliations or financial interests with any book publications featured in this presentation. All references are shown as part of the educational learning.

Conditions Treated With Hyperbaric Therapy:

FDA Approved Conditions

Actinomycosis
Air or Gas Embolism
Carbon Monoxide Poisoning
and Smoke Inhalation
Gas Gangrene
Cyanide poisoning

Crush Injury and other Acute
Traumatic Ischemias
Decompression Sickness
Diabetic Wounds
Necrotizing Soft Tissue
Infections

Osteomyelitis (Refractory)
Radiation Tissue Damage
Severe Anemia
Skin Grafts and Flaps
(Compromised)
Thermal Burns

Off Label Conditions

ADD/ADHD
ALS
Alzheimer's
Anoxic Brain Injury
Autism
Bell's Palsy
Cancer
Cerebral Palsy
Chronic Fatigue
Chronic Inflammatory Disease
Crohn's disease
Decreased Immune Function
Diabetes
Fibromyalgia

General Wellness/ Prevention
Heart Disease
Infections
Immune Dysfunction
Lyme Disease
Macula Degeneration
Meniere's Disease
Migraines
Mitochondrial Disorders
Multiple Sclerosis
Near Drowning
Peripheral Neuropathy
Post Electrocution
Raynaud's Phenomenon

Reflex Sympathetic Dystrophy
Retinitis Pigmentosa
Rheumatoid Arthritis
Severed Limbs
Sickle Cell Crisis
Spinal Cord Injury
Sports Injuries
Stroke
Surgery Pre and Post
Traumatic Brain Injury
Trigeminal Neuralgia
Vascular Disease
Venomous Bites

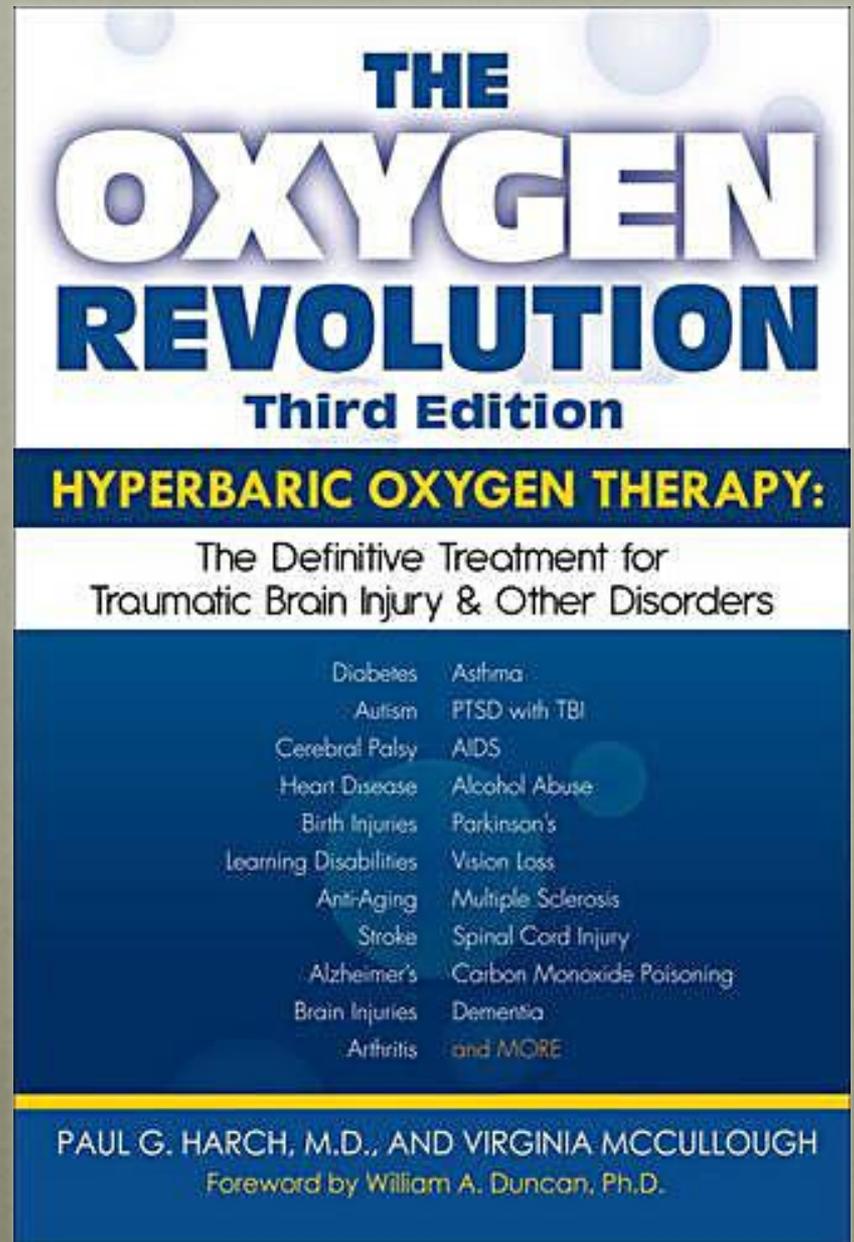
and other conditions

www.completemedicalequipments.in

Double blinded placebo controlled studies along with evidenced based scientific reviews have been published on the efficacy of

HBOT

and case studies are abundant.

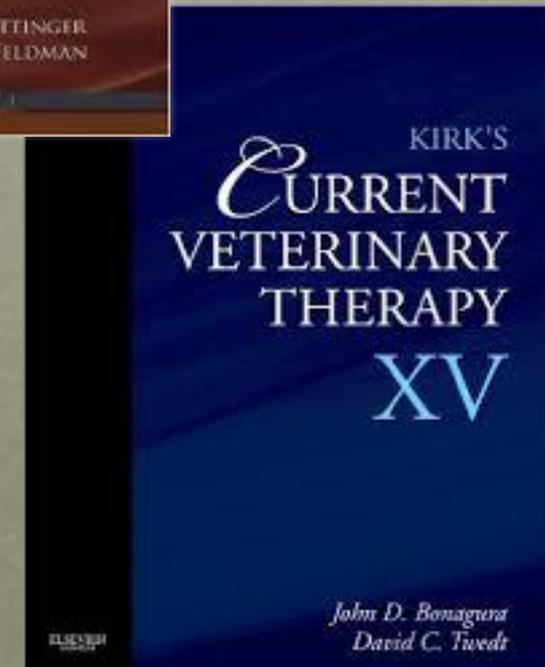
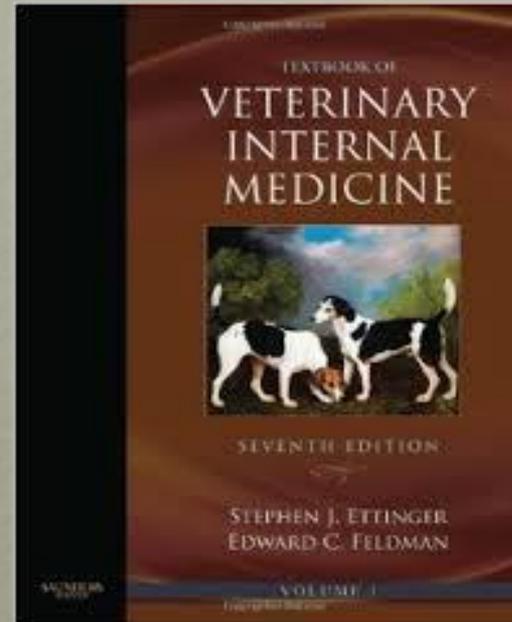


CLINICAL APPLICATIONS ARE
DESCRIBED IN MAJOR
VETERINARY TEXTS

Vet Book Chapters on HBOT

ETTINGER'S Textbook on
Veterinary Internal Medicine

Bonagura's CURRENT
VETERINARY THERAPY XV



HBOT and its role in the therapy of human infectious diseases is described at length in the Emergency Medical Clinics of North America



Endocrine and Metabolic
Emergencies

EMERGENCY MEDICINE CLINICS OF NORTH AMERICA



August 2005

Volume 23

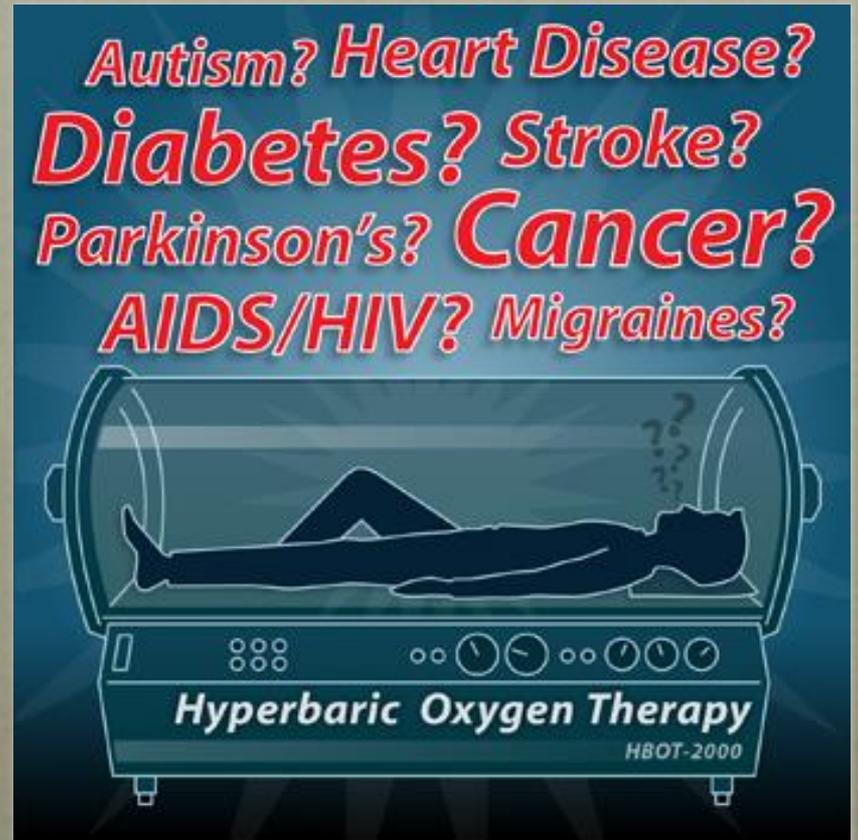
Number 3

theclinics.com

GUEST EDITORS

Mary Jo Wagner, MD, FACEP and
Kathleen Cowling, DO, MS, FACEP

Kaide concluded with the statement “in his opinion withholding HBOT because of a lack of randomized trials in the face of a huge body of clinical experience and invitro studies , especially in these devastating disease processes would be bordering on unethical and malpractice.



SO MAYBE IT'S TIME TO ADD
HYPERBARICS TO YOUR PRACTICE?



HBOT, therefore enhances:

REPAIR

REGENERATION

HEALING

FUNCTION

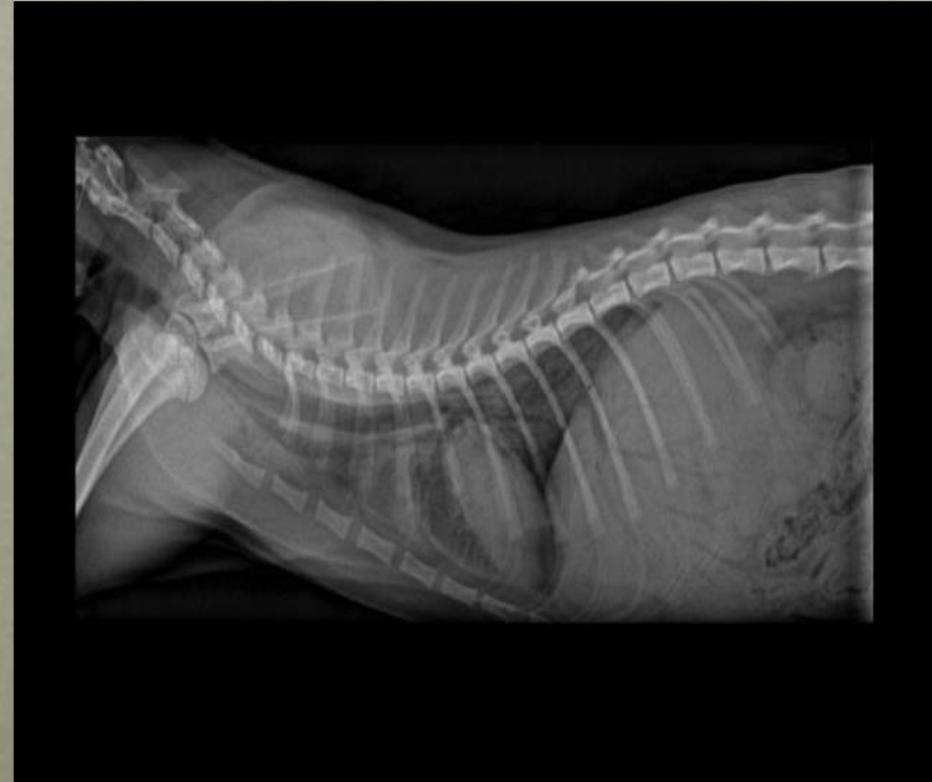


Here's WHAT the 14
FDA approved HBOT
TREATMENTS
look like in veterinary
medicine...



HBOT FOR AIR EMBOLISM

YES, THIS IS AN
AIR
EMBOLISM...THERE
IS AIR IN THE
CRANIAL VENA
CAVA, THE
RIGHT SIDE OF
THE HEART AND
IN THE LIVER.



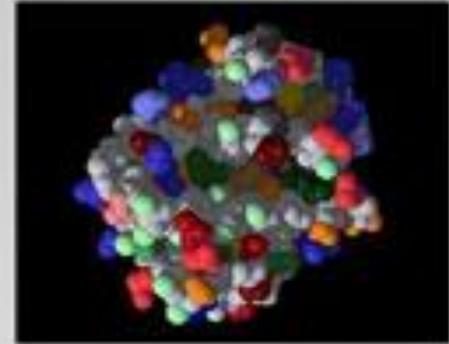
HBOT FOR CARBON MONOXIDE POISONING

CO Poisoning, cyanide poisoning, methylene chloride poisoning.



"Saved"
By Edwin Landseer

Carbon Monoxide



- Most common cause of deaths from acute poisoning
- Generated by incomplete combustion of carbon-containing (organic) products
- Most fatalities result from fires
- Stoves, portable heaters, and automobile exhaust cause approximately one third of deaths





HBOT FOR GAS
GANGRENE

Clostridial
Myositis and
myo-necrosis

Lateral view of the left hind limb after removal of hair on initial examination.

Note the soft tissue swelling and discoloration of the skin into dark-red color at the caudal aspect of the thigh (The site of the intramuscular injection).



HBOT FOR CRUSH INJURY

Acute ischemia, usually
caused by HBC's and
bite wounds...

We see these
everyday!!!!





BUT THESE ARE CRUSH
INJURIES ALSO!!!





HBOT FOR DECOMPRESSION DISEASE





HBOT FOR ARTERIAL INSUFFICIENCIES

Problem wounds





HBOT FOR SEVERE ANEMIA
AND ACUTE BLOOD LOSS



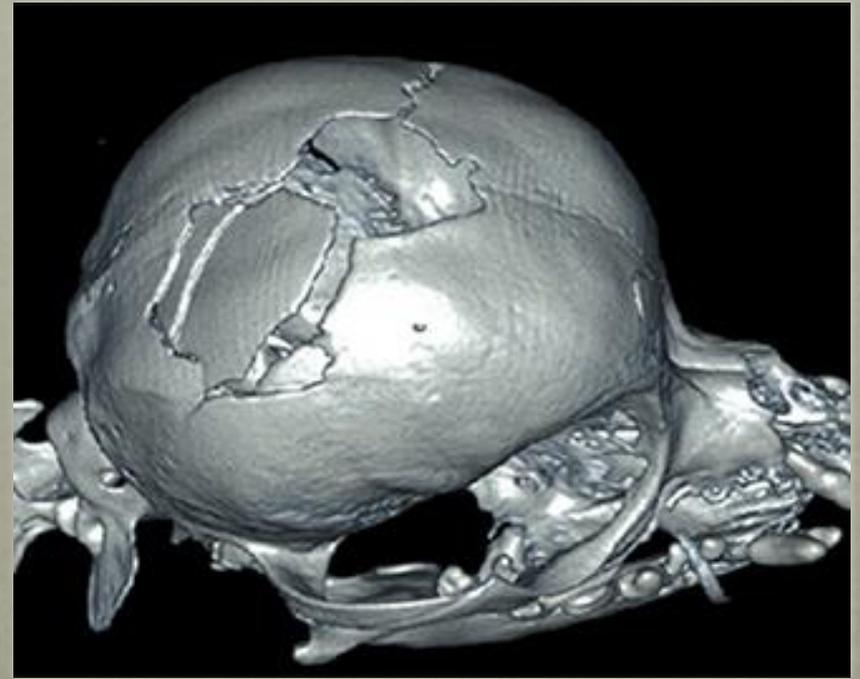


HBOT AND INTRACRANIAL ABSCESS AND TRAUMATIC BRAIN INJURY (TBI)

An accumulation of infected
material, these abscesses of the
brain are common in patients with
trauma



THIS 5 YEAR OLD CHIHUAHUA
WAS BITTEN IN THE HEAD BY
ANOTHER DOG



HBOT FOR NECROTIZING SOFT TISSUE INFECTIONS

Could be from “flesh eating
bacteria” that usually progress
rapidly...

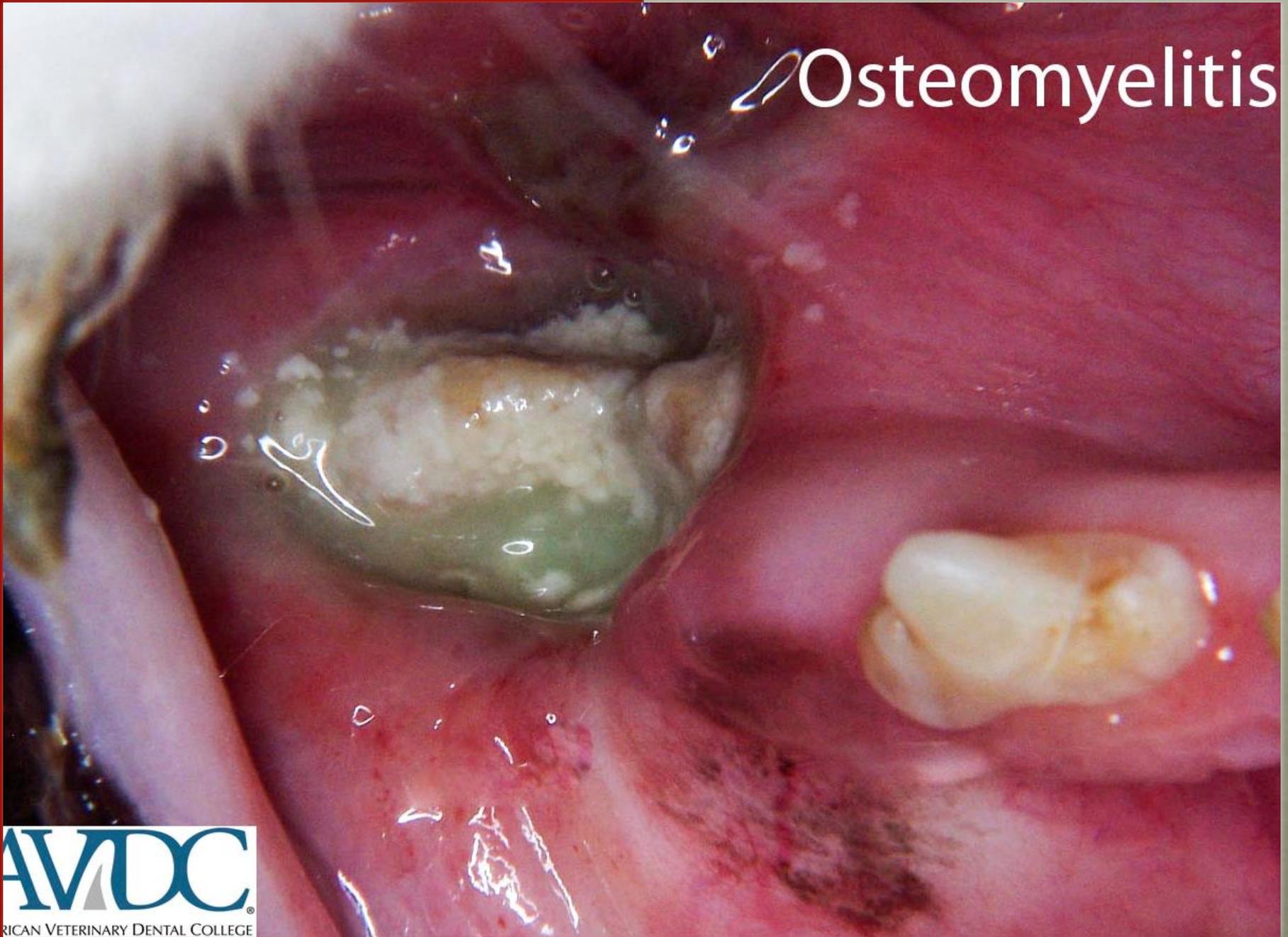


HBOT FOR OSTEOMYELITIS

Chronic bone infections that resist
standard treatment.



Osteomyelitis



OSTEOGENESIS IS ENHANCED
POSTOPERATIVELY AFTER
BONE LOSS DUE TO TOOTH
ROOT ABSCESSSES



HBOT FOR POST RADIONECROSIS



Radio-Therapy can induce normal tissue complications in the radiation treatment field.

These will benefit from HBOT!



HBOT FOR COMPROMISED SKIN GRAFTS AND FLAPS





©2008 Vet Surgery



HBOT FOR THERMAL BURN INJURY





Day 2

Day 7

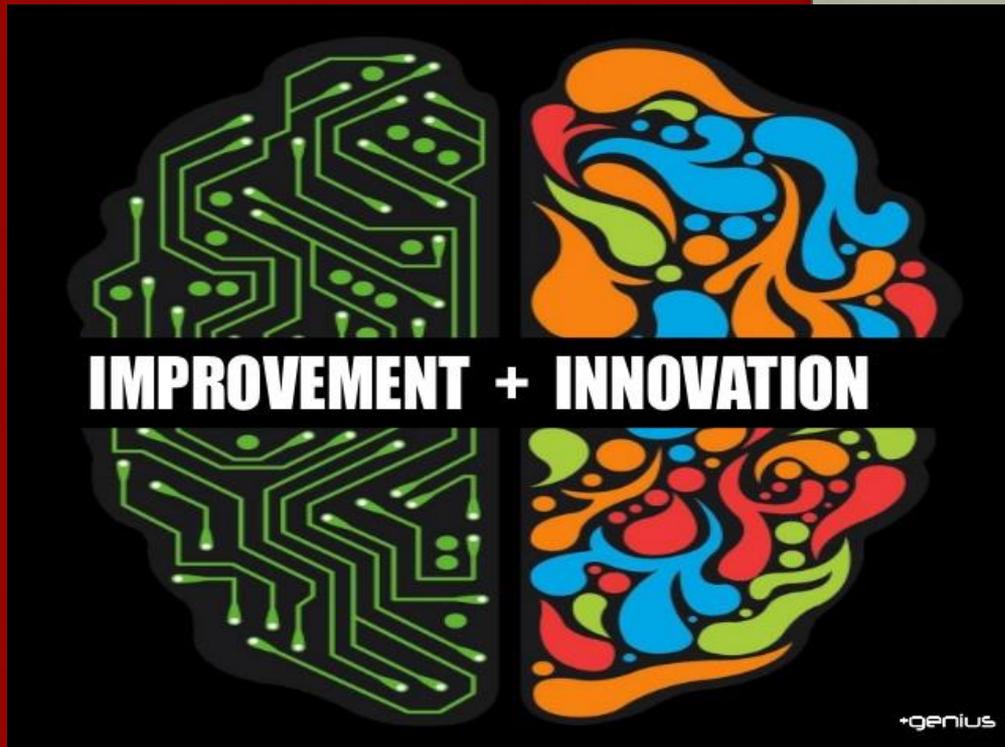
Day 20

Day 30



HBOT FOR
IDIOPATHIC
SUDDEN SENSORI
NEURAL HEARING
LOSS





The following indications have been introduced due to a growing body of evidence in support of using HBOT . . .

STROKE

In a review of 122 patients the American Stroke Association

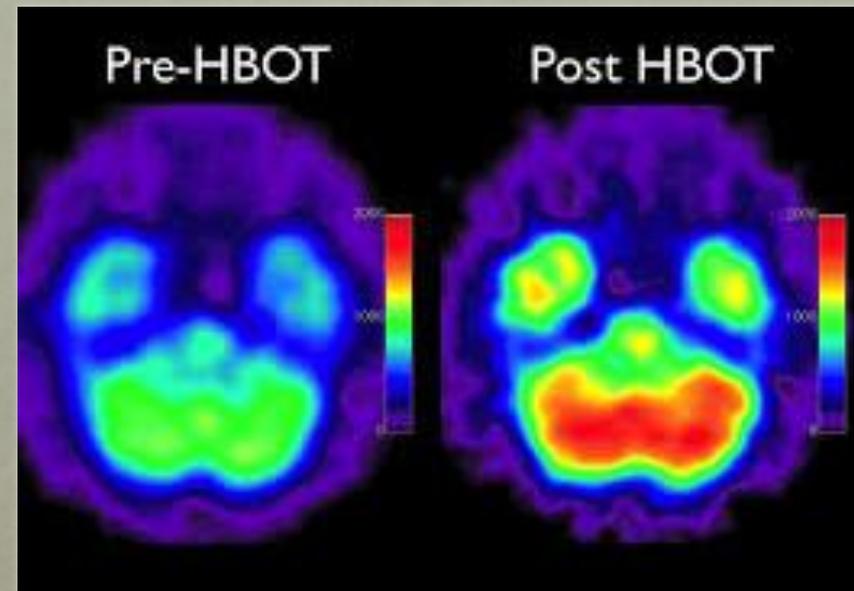
suggests that a significant number of our patients with completed stroke may benefit from HBOT”.



Stroke in Animals...

STROKE

There have been more than 30 human studies showing that HBOT can minimize injury and improve outcome if used shortly after a stroke. Other research shows that it can improve function even years after a stroke—particularly in patients who had strokes that don't involve paralysis.



So why not use HBOT

Heat Stroke

Spinal Cord Stroke (FCE)

Vestibular Disease

Cerebrovascular
accidents(CVA)

Transient Ischemic Attacks

HYPERBARIC
OXYGEN TREATMENT
IN POSTOPERATIVE
NEUROSURGICAL
INFECTIONS AND
POST GENERAL
NEUROSURGERY



39 consecutive patients

Larsson, Engstrom et al.

Stockholm Sweden

Objective: To evaluate the clinical usefulness of hyperbaric oxygen therapy for neurosurgical infections after craniotomy or laminectomy

Conclusion: HBOT is a safe, powerful treatment for postoperative cranial and spinal wound infections and should be included in the neurosurgical armamentarium.



Hyperbaric Oxygen Treatment for Inflammatory bowel disease: a systemic review analysis

Rossignol Review 2012

Thirteen studies of HBOT in Crohn's disease and 6 studies in ulcerative colitis were identified. In all studies participants had severe disease refractory to standard medical treatments, including corticosteroids, immunomodulators and anti-inflammatory medications. In Crohn's disease 31/40 (78%) had clinical improvements with HBOT, while all 39 patients with ulcerative colitis improved.

Daniel Rossignol

Conclusions: HBOT lowered markers of inflammation and oxidative stress and ameliorated IBD in both human and animal studies. Most treated patients were refractory to standard medical treatments.

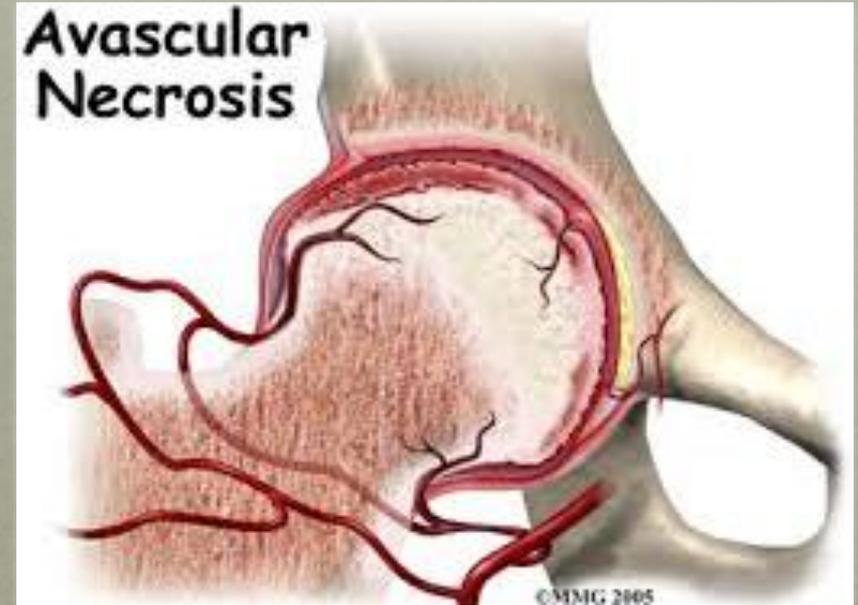


Hyperbaric Oxygen Therapy as a treatment for atage-1 avascular necrosis of the femoral head

In Veterinary Medicine this is Legg Calve Perthes Disease.

The Journal of Bone and Joint Surgery, N.D.Reis, et.al. Rambam Medical Center, Haifa, Israel.

Avascular necrosis (AVN) is a potentially crippling disease affecting mainly young adults. This study selected 12 patients suffering from Steinberg stage-1 AVN of the femoral head whose lesions were 4 mm thick or more. 81% of the patients who received HBOT showed a return to normal on MRI compared to 17% in the untreated group.



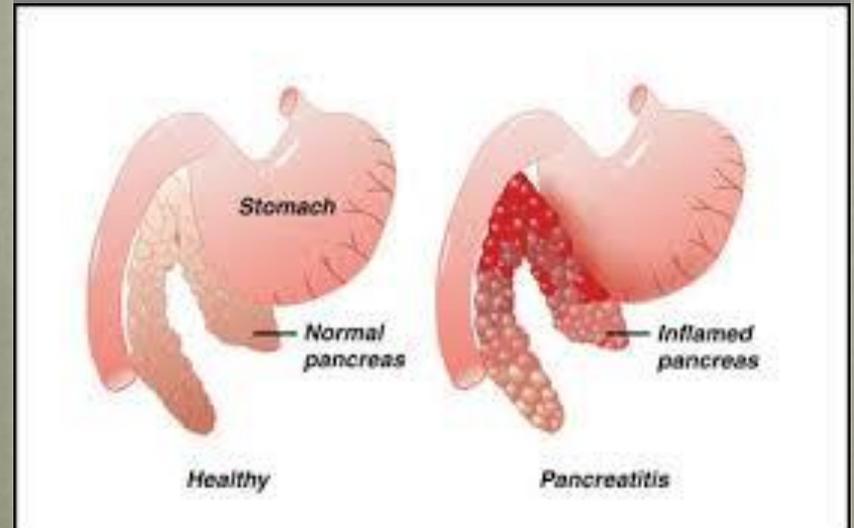
Potential Effects of Hyperbaric Oxygen Therapy in Acute Pancreatitis

Christine Cuthbertson, et.al.

University of Melbourne, Australia

Object: To extract from published reports the effects of HBOT on inflammatory disease, in particular acute pancreatitis.

Conclusions: Acute pancreatitis impairs the pancreatic and systemic microcirculation and causes acute inflammation (20-30% develop pancreatic necrosis). These processes are potentially improved by HBO therapy.



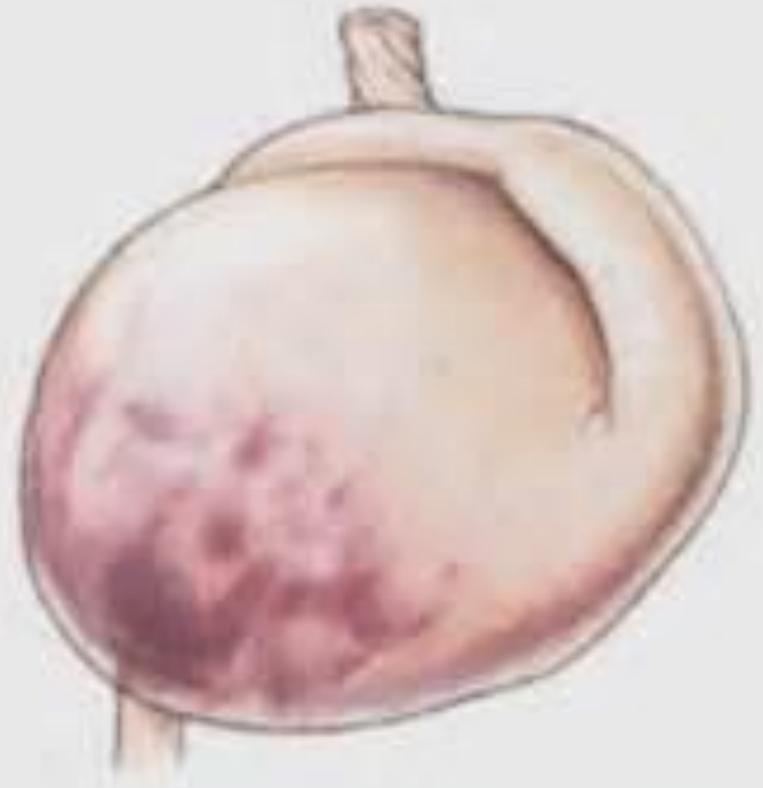
Hyperbaric Oxygen: Its application in cardiology: a historical perspective and personal journey

Ellestad, et.al. Cardiology Review 2009.

After encouraging animal work, HBO therapy was used in conjunction with thrombolytics to reduce the magnitude of injury in patients with acute myocardial infarction. The benefit is probably due to the decrease in reperfusion injury, which has been shown to be a major cause of myocardial cell death when the culprit artery is opened with a catheter.



AND DECREASED ISCHEMIA IN
YOUR POST OF GDV PATIENTS



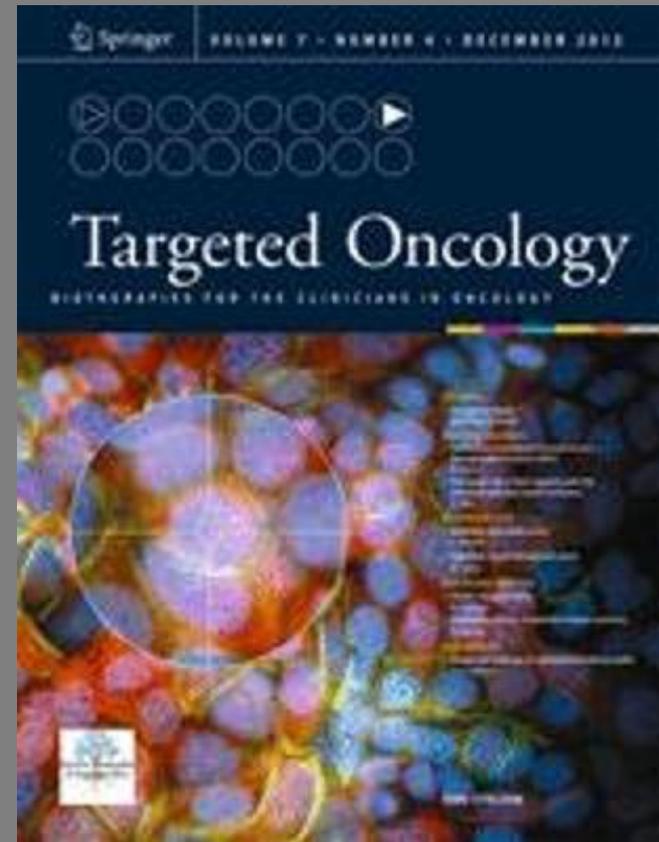
Reflections on the neurotherapeutic effects of hyperbaric oxygen

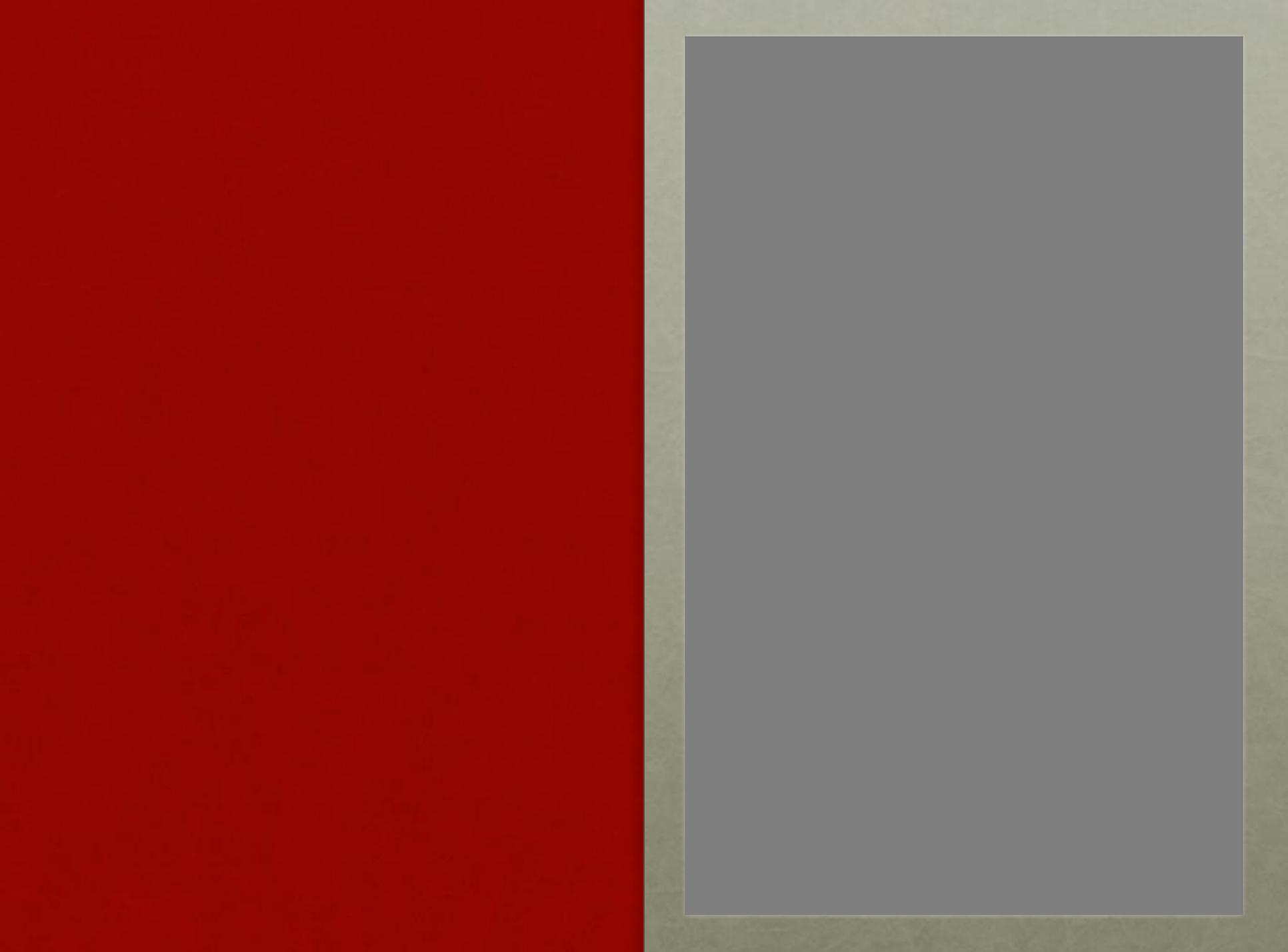
Shai Efrati and Eshel Ben-Jacob,
Sackler School of Medicine and Tel-
Aviv University 2014

Traumatic brain injury (TBI) and stroke are the major causes of brain damage and chronic neurological impairments. There is no agreed-upon effective metabolic intervention for TBI and stroke patients with chronic neurological dysfunction. Clinical studies published this year present convincing evidence that hyperbaric oxygen therapy (HBOT) might be the coveted neurotherapeutic method for brain repair.



To supplement the previous reviews, we have summarized the work performed on HBO and cancer in the period 2004–2012. Based on the present as well as previous reviews, there is no evidence indicating that HBO neither acts as a stimulator of tumor growth nor as an enhancer of recurrence. On the other hand, there is evidence that implies that HBO might have tumor-inhibitory effects in certain cancer subtypes, and we thus strongly believe that we need to expand our knowledge on the effect and the mechanisms behind tumor oxygenation.





LYME DISEASE

The purpose of this study was to determine if hyperbaric oxygen therapy affected Lyme disease caused by the spirochete, *Borrelia burgdorferi*. Ninety-one subjects completed a total of 1,995 hyperbaric oxygen treatments

Although additional statistical evaluation still is being carried out, it appears that approximately 84.8% of those treated showed significant improvement by a decrease or elimination of symptoms

Fife, William P; Freeman, DM.
"Treatment of Lyme disease with hyperbaric oxygen therapy"



Stem Cell Mobilization by Hyperbaric Oxygen

Steven Thom, et.al. 2005

University of Pennsylvania Medical Center, Philadelphia, PA.

In over a course of 20 HBOT treatments, circulating CD-34 cells increased eightfold.

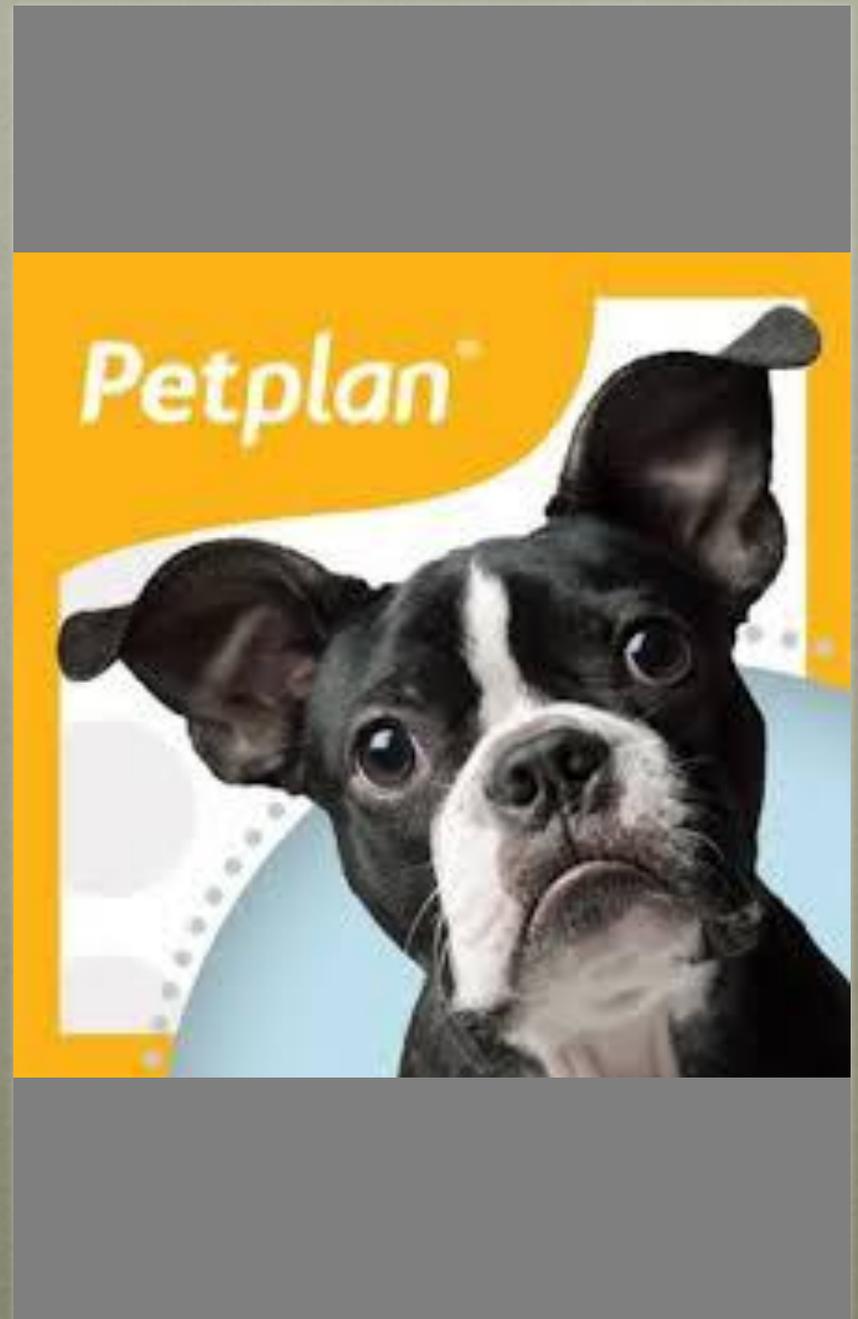
It was concluded that HBOT mobilizes stem/progenitor cells by stimulating nitric oxide synthesis.

WHAT IS A STEM CELL?

A Stem Cell is a basic cell, that has the ability to become any of the 220 different cells in the body.



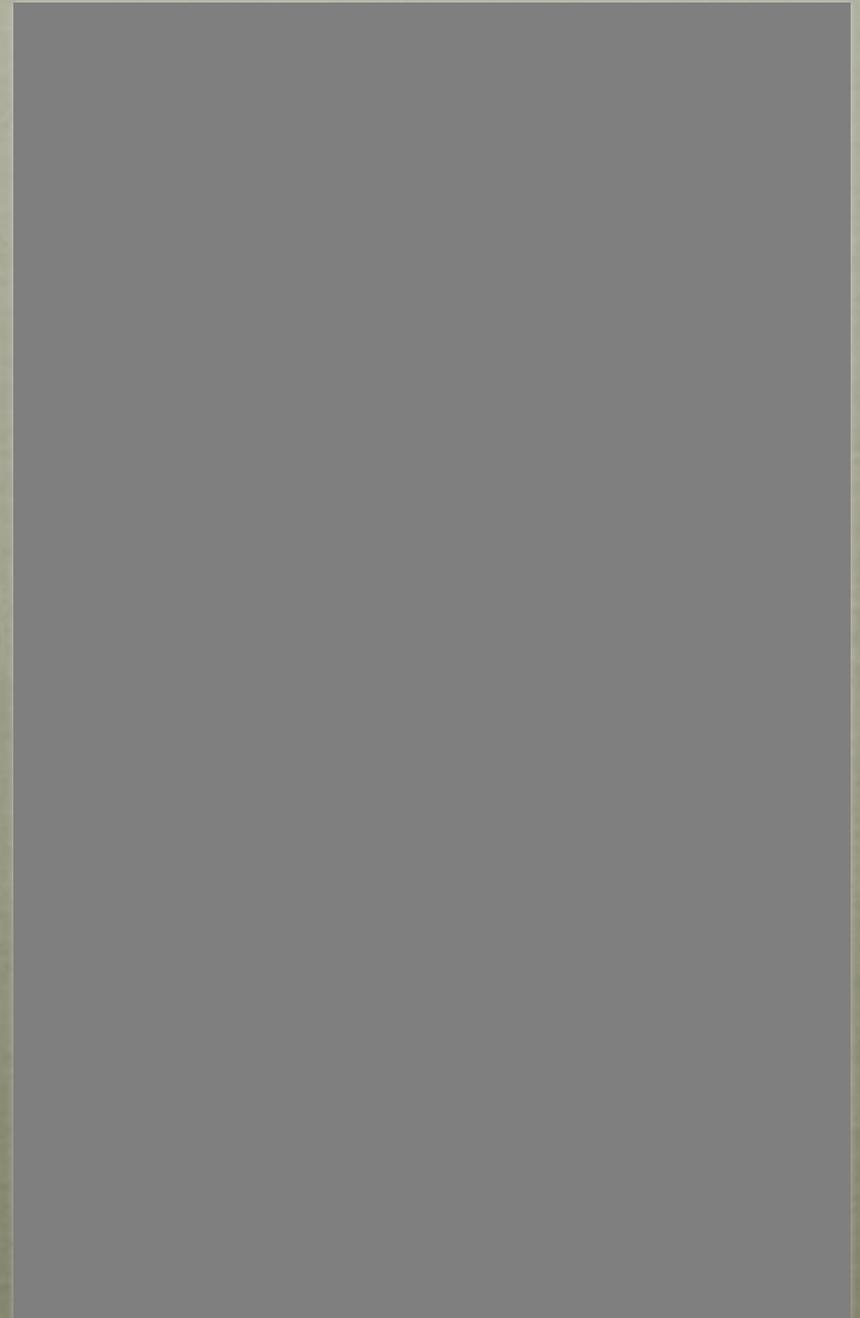
Core policy's now includes: bone marrow transplants, colloidal silver treatments, gold seed therapy, herbal therapy, *hyperbaric oxygen therapy*, kidney transplants, platelet rich plasma injections, polyethylene glycol medication, shockwave therapy, and stem cell therapy.



Trupanion Announces Major Pet Insurance Policy Enhancements

SEATTLE, WA/March 8, 2013 —

Trupanion, a leading provider of pet insurance, today announced several policy enhancements that help maintain their distinction as the pet insurance provider with the most comprehensive accident and illness coverage in North America. These enhancements were made based on data and direct feedback from pet owners and the veterinary community.



Trupanion's only additional health care rider – the “Additional Care Package” – has been enhanced to include the following 17 modalities: acupuncture, behavioral modification, bone marrow transplants, chiropractic, colloidal silver treatments, gold seed therapy, herbal therapy, homeopathy, hydrotherapy, hyperbaric oxygen therapy, kidney transplants, naturopathy, physical/rehabilitative therapy, platelet rich plasma injections, polyethylene glycol medication, shock-wave therapy, and stem cell therapy.

All veterinary-recommended treatments will be covered with no financial limits, making it simple for both pet owners and veterinarians to understand.





top 10 most extraordinary treatments covered

conditions:

skin infection secondary to g-tube placement for intestinal lymphoma

years insured: 5

claims: 105

treatment:

hyperbaric oxygen chamber

amount reimbursed:
\$29,946.41



Spooky, Domestic Shorthair

Spooky was diagnosed with intestinal lymphoma after her pet parent noticed she was reluctant to eat. During chemotherapy treatments, Spooky became anorexic and a g-tube was placed. Spooky developed an infection at the tube site that was resistant to antibiotic therapy. The vet recommended hyperbaric oxygen chamber treatment, and 20 treatments were planned to treat the draining fistula/g-tube site infection.

BEFORE & AFTER PHOTOS

Rattlesnake Bites:
Pre HBOT



After 12 HBOT Tx



BEFORE & AFTER PHOTOS



BEFORE & AFTER PHOTOS

Bite and Kidney:
Post Debridement – Pre HBOT



After 17 HBOT Tx



BEFORE & AFTER PHOTOS

Thermal Burn:
Post Debridement – Pre HBOT



After 30 HBOT Tx



BEFORE & AFTER PHOTOS

Envenomation:
After 1st HBOT Tx



4 Days After 5th HBOT Tx



BEFORE & AFTER PHOTOS

Chemical Burn:
Pre HBOT



After 35 HBOT Tx



BEFORE & AFTER PHOTOS

Deep Dog Bite Wounds:
Pre HBOT



After 15 HBOT Tx



BEFORE & AFTER PHOTOS

Necrotic Wound prior to HBOT



After 5 HBOT TX's - 6
days later



BEFORE & AFTER PHOTOS

Presenting HBC 6 days ago

After 5 HBOT TX's over 7 days



BEFORE & AFTER PHOTOS

Chronic non-healing
wound



After 5 HBOT TX's- 7 days



WHAT ELSE CAN WE TREAT?

300LB Loggerhead
Turtle with Chronic
Osteomyelitis of Flipper



Eagle with Aspergillosis
Infection



BEFORE & AFTER PHOTOS

Guinea pig on presentation
after limb FX and resulting
tissue necrosis.



After final HBOT TX – 5
TX's over 8 days.



BEFORE & AFTER PHOTOS

Guinea Pig before

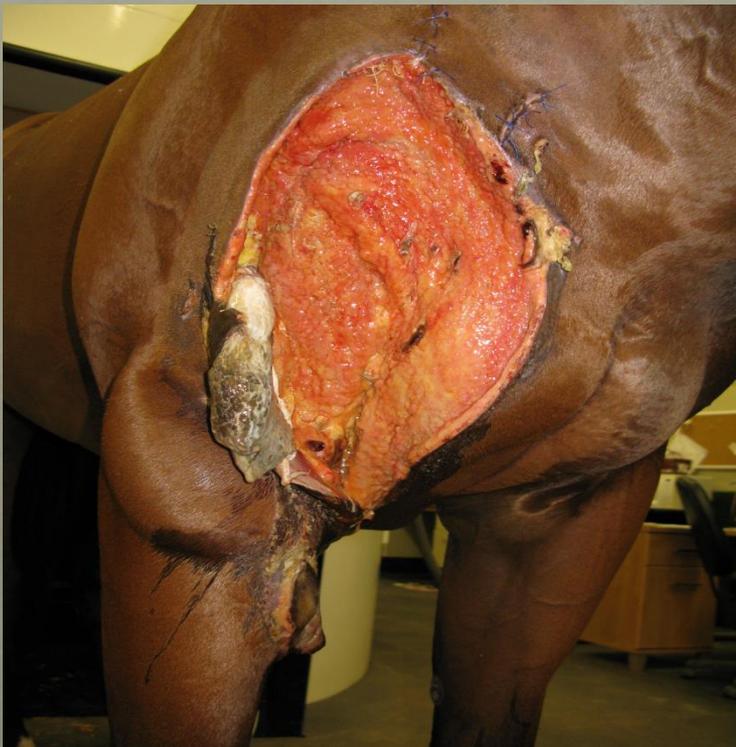


Guinea Pig after



BEFORE & AFTER PHOTOS

Equine shoulder wound 2 days
after insult- prior to HBOT



18 days later- 10 TX's daily then
4 EOD = total 14 HBOT TX's



BEFORE & AFTER PHOTOS

Nail in foot- fungal
osteomyelitis blastomycosis

Prior to nail removal and
HBOT



BEFORE & AFTER PHOTOS

During HBOT TX
(after session # 3)



After 8 HBOT sessions-
returned to the show ring.



BEFORE & AFTER PHOTOS

Thermal burns on
presentation- 24 hrs. after
insult



After 5 HBOT TX's –
over 5 days



NEW CREDENTIALS

The national Board of Diving
and Hyperbaric Medical
Technology,

The organization designed to meet the
clinical, technical, and safety needs of
the discipline of undersea and hyperbaric
medicine now offers a certification called
CHT-V

**CERTIFIED HYPERBARIC
TECHNOLOGIST
VETERINARY!**





Food for thought,

A discussion to
nourish your mind...
And bring new ideas
to your practice.

