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The Heart of Chiropractic:

How Studying the Heart Gives Us a Deeper Understanding of Chiropractic and Healthy Physiology

Dr. Stephen Hussey MS, DC

UVCA 2023 Fall Convention

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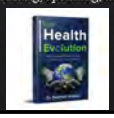
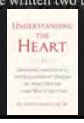
About Me

- Grew up in Western North Carolina – lots of chronic disease as a child
- Undergraduate degree in Health and Wellness Promotion from UNC-Asheville
- Doctor of Chiropractic and Masters in Human Nutrition and Functional Medicine from University of Western States
- I have practiced chiropractic for about 11 years. Have practiced in Ireland, South Carolina, and have been in Virginia for the last 6 years.
- In addition to Chiropractic, I do online health consulting, speaking, and have written two books.





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Disclaimer

- The practice of cardiology is not within the scope of a Chiropractic physician.
- We cannot diagnose or treat cardiovascular disease.
- The following presentation is for medical professional education only.
- All Chiropractic patients with heart disease should be under concurrent care of a cardiologist.
- We can help create overall health in our patients through modalities within our scope.

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Topics

- Cholesterol does not cause atherosclerosis, clotting does
- The heart is not the main mover of blood in the body
- Quantum Chiropractic. HRV, Fascia, Coherence, and Chiropractic
- Not all heart attacks happen because of a blockage

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How Did the Theory That Cholesterol Causes Heart Disease Come About?

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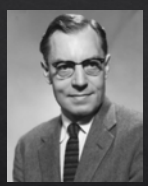
The Diet Heart Hypothesis

- In 1953, Ancel Keys made some bold conclusions based on his six countries study, followed by his seven countries study. He claimed that heart disease was caused by dietary fat consumption.
- Why he neglected to include the data from all 22 countries available data we may never know.



Keys, A. (1957). Diet and the epidemiology of coronary heart disease. *Journal of the American Medical Association, 164*(17), 1912. doi:10.1001/jama.1957.62980170024007c

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Epidemiology

- Association, not causation
- Relying on people to recall and accurately report what they ate
- Healthy user bias
- Relative Risk vs. Absolute Risk

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Leiden 85-plus study, Lothian birth cohort study

- Those with highest cholesterol had:
  - Highest cognitive abilities
  - Lower rates of infection
  - Lowest stroke rates
  - Lowest rates of heart disease
  - Lowest rates of cancer
  - Lowest all-cause mortality

Deary, I. J., Gow, A. J., Pattie, A., & Starr, J. M. (2011). Cohort Profile: The Lothian Birth Cohorts of 1921 and 1936. *International Journal of Epidemiology*, 41(6), 1576-1584. doi:10.1093/ije/dyr197
Van Peet, P. G., Drewes, Y. M., De Craen, A. J., Westendorp, R. G., Gussekloo, J., & De Ruijter, W. (2012). Prognostic value of cardiovascular disease status: the Leiden 85-plus study. *AGE*, 35(4), 1433-1444. doi:10.1007/s11357-012-9443-5

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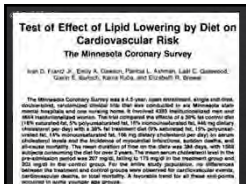

Test of Effect of Lipid Lowering by Diet on Cardiovascular Risk

The Minnesota Coronary Survey

Ivan D. Frantz Jr., Emily A. Dawson, Pamela L. Ashman, Lael C. Gatewood, Gavin E. Bartsch, Kaina Kuba, and Elizabeth R. Brewer

The Minnesota Coronary Survey was a 4.5-year, open-enrollment, single-blind, double-blind, randomized clinical trial that was conducted in six Minneapolis state-mental hospitals and one nursing home. It involved 4393 institutionalized men and 6874 institutionalized women. The trial compared the effects of a 39% fat control diet (18% saturated-fat, 5% polyunsaturated fat, 16% monounsaturated fat, 846 mg dietary cholesterol per day) with a 38% fat treatment diet (9% saturated fat, 18% polyunsaturated fat, 14% monounsaturated fat, 196 mg dietary cholesterol per day) on serum cholesterol level and, hence, on the incidence of coronary heart disease and all-cause mortality. The mean duration of time on the diets was 384 days, with 1892 subjects consuming the diet for over 2 years. The mean serum cholesterol level in the pre-admission period was 207 mg/dl, falling to 175 mg/dl in the treatment group and 352 mg/dl in the control group. For the entire study population, no differences between the treatment and control groups were observed for cardiovascular events, cardiovascular deaths, or total mortality. A favorable trend for all these end-points was observed in subjects over 64 years of age.

(Arteriosclerosis 9:129–135, January/February 1989)

previous myocardial infarction were omitted from the study. Other combinations of end-points were examined. Subsequent events after the initial one in a given subject were disregarded. None of these maneuvers changed the conclusions.

Although this study did not show a statistically significant reduction in cardiovascular events or total deaths from the treatment diet, the authors suspect that it might have shown such a reduction if the period of treatment had been longer in persons in the age range likely to benefit. We included persons of all ages, both men and women, with an average cholesterol concentration of 207 mg/dl, compared to about 290 mg/dl for the participants in the Helsinki and Lipid Research Clinics trials. When the study was first proposed, very lengthy stays in mental hospitals were common. By the end of the initial 3-year pre-treatment observation period, the practice of vigorous drug treatment and early discharge to the community was in full swing.

Table 5, in which the analysis is confined to persons on diet for at least 2 years and in the age groups chosen

But Don't Saturated Fats Cause Heart Disease?

Re-evaluation of the traditional diet-heart hypothesis: analysis of recovered data from Minnesota Coronary Experiment (1968-73)

Christopher E Ramsden,[1,2] Daisy Zamora,[3] Sharon Majchrzak-Hong,[1] Keturah R Faurot,[1] Steven K Broste,[4] Robert P Frantz,[5] John M Davis,[1,6] Amit Ringel,[7] Chirayath M Suchindran,[1] Joseph R Hibbeln[1]

RESULTS

The intervention group had significant reduction in serum cholesterol compared with controls (mean change from baseline −13.8% v −1.0%; P<0.001). Kaplan Meier graphs showed no mortality benefit for the intervention group in the full randomized cohort or for any prespecified subgroup. There was a 22% higher risk of death for each 30 mg/dL (0.78 mmol/L) reduction in serum cholesterol in covariate adjusted Cox regression models (hazard ratio 1.22, 95% confidence interval 1.14 to 1.32; P<0.001). There was no evidence of benefit in the intervention group for coronary atherosclerosis or myocardial infarcts.

Systematic review identified five randomized controlled trials for inclusion (n=10 808). In meta-analyses, these cholesterol lowering interventions showed no evidence of benefit on mortality from coronary heart disease (1.13, 0.83 to 1.54) or all cause mortality (1.01, 0.90 to 1.27).

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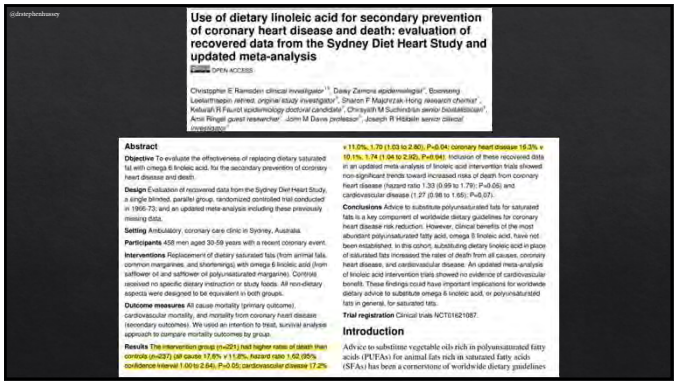
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Use of dietary linoleic acid for secondary prevention of coronary heart disease and death: evaluation of recovered data from the Sydney Diet Heart Study and updated meta-analysis
OPEN ACCESS
Abstract
Objective To evaluate the effectiveness of replacing dietary saturated fat with omega 6 linoleic acid, for the secondary prevention of coronary heart disease and death.
Design Evaluation of recovered data from the Sydney Diet Heart Study, a single blinded, parallel group, randomized controlled trial conducted in 1966-73; and an updated meta-analysis including these previously missing data.
Setting Ambulatory, coronary care clinic in Sydney, Australia.
Participants 458 men aged 30-59 years with a recent coronary event.
Interventions Replacement of dietary saturated fats (from animal fats, common margarines, and shortenings) with omega 6 linoleic acid (from safflower oil and safflower oil polyunsaturated margarine). Controls received no specific dietary instruction or study foods. All non-dietary aspects were designed to be equivalent in both groups.
Outcome measures All cause mortality (primary outcome), cardiovascular mortality, and mortality from coronary heart disease (secondary outcomes). We used an intention to treat, survival analysis approach to compare mortality outcomes by group.
Results The intervention group (n=221) had higher rates of death than controls (n=237) (all cause 17.6% v 11.8%, hazard ratio 1.62 (95% confidence interval 1.00 to 2.64), P=0.05; cardiovascular disease 17.2% v 11.0%, 1.70 (1.03 to 2.80), P=0.04; coronary heart disease 16.3% v 10.1%, 1.74 (1.04 to 2.92), P=0.04). Inclusion of these recovered data in an updated meta-analysis of linoleic acid intervention trials showed non-significant trends toward increased risks of death from coronary heart disease (hazard ratio 1.33 (0.99 to 1.79); P=0.05) and cardiovascular disease (1.27 (0.98 to 1.65); P=0.07).
Conclusions Advice to substitute polyunsaturated fats for saturated fats is a key component of worldwide dietary guidelines for coronary heart disease risk reduction. However, clinical benefits of the most abundant polyunsaturated fatty acid, omega 6 linoleic acid, have not been established. In this cohort, substituting dietary linoleic acid in place of saturated fats increased the rates of death from all causes, coronary heart disease, and cardiovascular disease. An updated meta-analysis of linoleic acid intervention trials showed no evidence of cardiovascular benefit. These findings could have important implications for worldwide dietary advice to substitute omega 6 linoleic acid, or polyunsaturated fats in general, for saturated fats.
Trial registration Clinical trials NCT01621087.
Introduction
Advice to substitute vegetable oils rich in polyunsaturated fatty acids (PUFAs) for animal fats rich in saturated fatty acids (SFAs) has been a cornerstone of worldwide dietary guidelines

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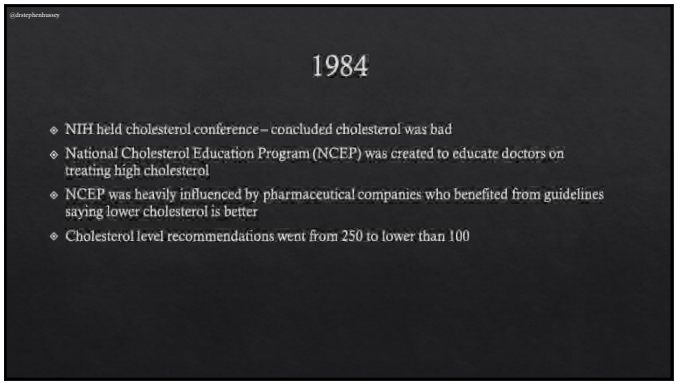
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1984
NIH held cholesterol conference – concluded cholesterol was bad
National Cholesterol Education Program (NCEP) was created to educate doctors on treating high cholesterol
NCEP was heavily influenced by pharmaceutical companies who benefited from guidelines saying lower cholesterol is better
Cholesterol level recommendations went from 250 to lower than 100

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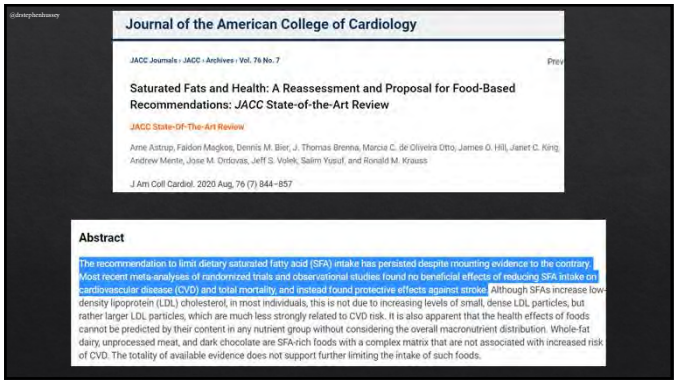
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Journal of the American College of Cardiology
JACC Journals › JACC: Archives › Vol. 76 No. 7
Saturated Fats and Health: A Reassessment and Proposal for Food-Based Recommendations: JACC State-of-the-Art Review
JACC State-Of-The-Art Review
Arne Astrup, Faidon Magkos, Dennis M. Bier, J. Thomas Brenna, Marcia C. de Oliveira Otto, James O. Hill, Janet C. King, Andrew Mente, Jose M. Ordovas, Jeff S. Volek, Salim Yusuf, and Ronald M. Krauss
J Am Coll Cardiol. 2020 Aug, 76 (7) 844–857
Abstract
The recommendation to limit dietary saturated fatty acid (SFA) intake has persisted despite mounting evidence to the contrary. Most recent meta-analyses of randomized trials and observational studies found no beneficial effects of reducing SFA intake on cardiovascular disease (CVD) and total mortality, and instead found protective effects against stroke. Although SFAs increase low-density lipoprotein (LDL) cholesterol, in most individuals, this is not due to increasing levels of small, dense LDL particles, but rather larger LDL particles, which are much less strongly related to CVD risk. It is also apparent that the health effects of foods cannot be predicted by their content in any nutrient group without considering the overall macronutrient distribution. Whole-fat dairy, unprocessed meat, and dark chocolate are SFA-rich foods with a complex matrix that are not associated with increased risk of CVD. The totality of available evidence does not support further limiting the intake of such foods.

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- A study in 2009 that included 231,836 people in 541 hospitals, which was 59% of heart attack admission from 2000 to 2006, measured cholesterol levels within 24 hours of admission.
- 75% of subjects had normal LDL levels (under 130 mg/dl) and 50% had optimal levels (under 100 mg/dl)

Sachdeva, A., Cannon, C. P., Deedwania, P. C., LaBresh, K. A., Smith, S. C., Dai, D., … Fonarow, G. C. (2009). Lipid levels in patients hospitalized with coronary artery disease: An analysis of 136,905 hospitalizations in Get With The Guidelines. *American Heart Journal, 157*(1), 111-117.e2. doi:10.1016/j.ahj.2008.08.010

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Higher Cholesterol Not Associated with CVD but is Associated with Longevity

9. Conclusion

The idea that high cholesterol levels in the blood are the main cause of CVD is impossible because people with low levels become just as atherosclerotic as people with high levels and their risk of suffering from CVD is the same or higher. The cholesterol hypothesis has been kept alive for decades by reviewers who have used misleading statistics, excluded the results from unsuccessful trials and ignored numerous contradictory observations.

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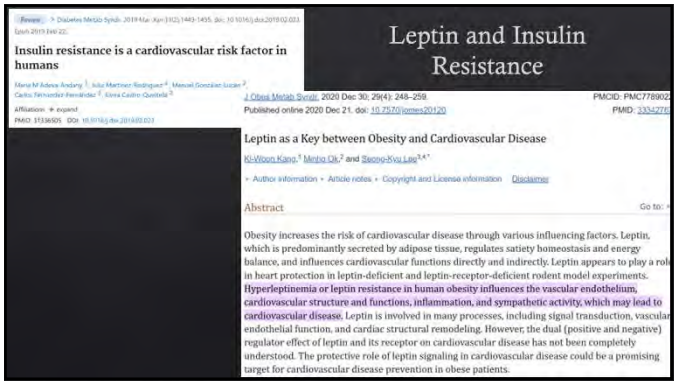
Leptin and Insulin Resistance
Insulin resistance is a cardiovascular risk factor in humans
J Obes Metab Syndr. 2020 Dec 30; 29(4): 248–259.
Published online 2020 Dec 21. doi: 10.7570/jomes20120
PMCID: PMC7789602
PMID: 33342781
Leptin as a Key between Obesity and Cardiovascular Disease
Ki-Woon Kang,[1] Minjo Ok,[2] and Seong-Kyu Lee[3,4]*
Abstract
Obesity increases the risk of cardiovascular disease through various influencing factors. Leptin, which is predominantly secreted by adipose tissue, regulates satiety homeostasis and energy balance, and influences cardiovascular functions directly and indirectly. Leptin appears to play a rol in heart protection in leptin-deficient and leptin-receptor-deficient rodent model experiments. Hyperleptinemia or leptin resistance in human obesity influences the vascular endothelium, cardiovascular structure and functions, inflammation, and sympathetic activity, which may lead to cardiovascular disease. Leptin is involved in many processes, including signal transduction, vascular endothelial function, and cardiac structural remodeling. However, the dual (positive and negative) regulator effect of leptin and its receptor on cardiovascular disease has not been completely understood. The protective role of leptin signaling in cardiovascular disease could be a promising target for cardiovascular disease prevention in obese patients.

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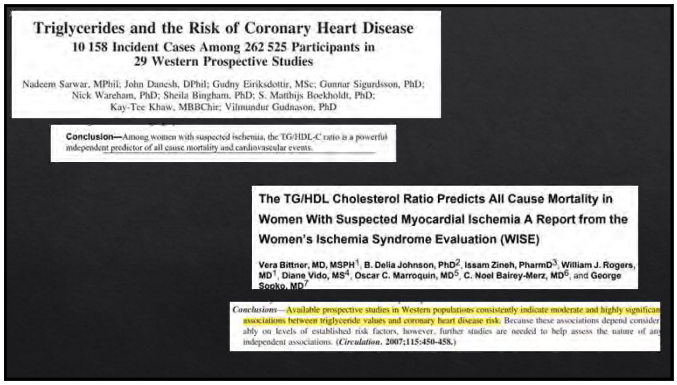
Triglycerides and the Risk of Coronary Heart Disease
10 158 Incident Cases Among 262 525 Participants in 29 Western Prospective Studies
Nadeem Sarwar, MPhil; John Danesh, DPhil; Gudny Eiriksdottir, MSc; Gunnar Sigurdsson, PhD; Nick Wareham, PhD; Sheila Bingham, PhD; S. Matthijs Boekholdt, PhD; Kay-Tee Khaw, MBBChir; Vilmundur Gudnason, PhD
Conclusion—Among women with suspected ischemia, the TG/HDL-C ratio is a powerful independent predictor of all cause mortality and cardiovascular events.
The TG/HDL Cholesterol Ratio Predicts All Cause Mortality in Women With Suspected Myocardial Ischemia A Report from the Women's Ischemia Syndrome Evaluation (WISE)
Vera Bittner, MD, MSPH[1], B. Delia Johnson, PhD[2], Issam Zineh, PharmD[3], William J. Rogers, MD[1], Diane Vido, MS[4], Oscar C. Marroquin, MD[5], C. Noel Bairey-Merz, MD[6], and George Sopko, MD[7]
Conclusions—Available prospective studies in Western populations consistently indicate moderate and highly significant associations between triglyceride values and coronary heart disease risk. Because these associations depend considerably on levels of established risk factors, however, further studies are needed to help assess the nature of any independent associations. (Circulation. 2007;115:450-458.)

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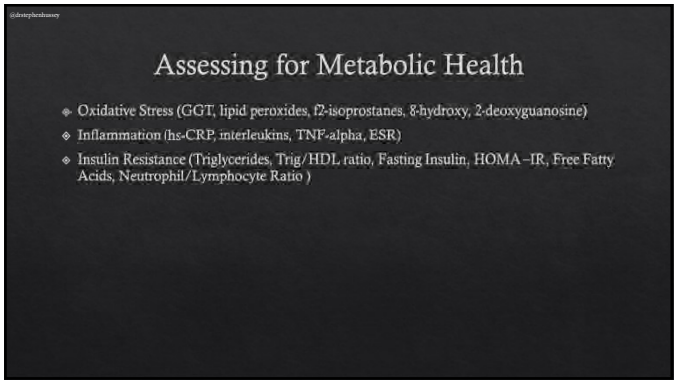
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Assessing for Metabolic Health
Oxidative Stress (GGT, lipid peroxides, f2-isoprostanes, 8-hydroxy, 2-deoxyguanosine)
Inflammation (hs-CRP, interleukins, TNF-alpha, ESR)
Insulin Resistance (Triglycerides, Trig/HDL ratio, Fasting Insulin, HOMA-IR, Free Fatty Acids, Neutrophil/Lymphocyte Ratio)

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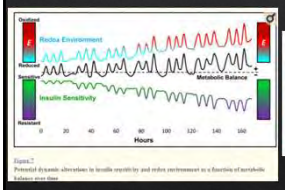
Oxidative Stress (GGT, lipid peroxides, f2-isoprostanes, 8-hydroxy-2-deoxyguanosine)

Linking mitochondrial bioenergetics to insulin resistance via redox biology

Kelsey H. Fisher-Wellman[1,2] and P. Darrell Neufer[1,2,3]



Concluding remarks

In the present review, the etiology of diet-induced insulin resistance is viewed in the context of mitochondrial bioenergetics and cellular redox biology. Nutrient overload places reducing pressure on the mitochondria, generating a transient elevation in H_2O_2 emission and an oxidative shift in redox environment, representing a primary mechanism by which cells sense and respond to metabolic imbalance. In contrast to the local oxidation of redox environment at the plasma membrane necessary for normal insulin signaling, the concept is put forward that insulin resistance develops as a consequence of persistent transient periods of mitochondrial H_2O_2 emission that outpace restoration of the redox reserve capacity, resulting in a cumulative oxidative shift in the global redox environment. This is predicted to depress phosphatase tone throughout the cell, ultimately leading to a persistent dominance in stress-sensitive

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Inflammation (hs-CRP, IL-1, IL-6, TNF-alpha, ESR)

Inflammation-Associated Insulin Resistance: Differential Effects in Rheumatoid Arthritis and Systemic Lupus Erythematosus Define Potential Mechanisms

Cecilia P. Chung[1], Annette Oeser[1], Joseph F. Solus[1], Tebeb Gebretsadik[1], Ayumi Shintani[1], Ingrid Avalos[1], Tuulikki Sokka[2], Paolo Raggi[3], Theodore Pincus[1], and C. Michael Stein[1]

Results—The HOMA value was higher in RA patients (median 2.05 [interquartile range (IQR) 1.05–3.54]) than in SLE patients (1.40 [0.78–2.59]) ($P = 0.007$). CRP and ESR did not differ significantly in RA and SLE patients. Body mass index (BMI) was significantly correlated with the HOMA index in both RA ($\rho = 0.20$) and SLE ($\rho = 0.54$), independently of age, sex, race, and current use of corticosteroids. In RA patients, the HOMA index was also significantly positively correlated with IL-6 ($\rho = 0.63$), TNFα ($\rho = 0.50$), CRP ($\rho = 0.29$), ESR ($\rho = 0.26$), coronary calcification ($\rho = 0.26$), and Disease Activity Score in 28 joints ($\rho = 0.21$); associations adjusted for age, sex, race, BMI, and current use of corticosteroids remained significant ($P < 0.05$). In SLE patients, the HOMA index was also significantly correlated with ESR ($\rho = 0.35$) and CRP ($\rho =$

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Insulin Resistance (Triglycerides, Trig/HDL ratio, Fasting Insulin, HOMA–IR, free fatty acids)

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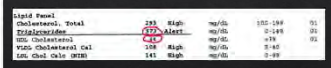
Triglyceride/HDL Ratio

Should be < 1.5

56-year-old female

95/106 = 0.89

47-year-old female



573/44 = 13.02

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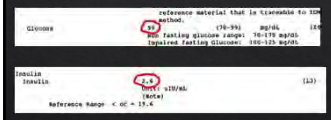
Homeostatic Model Assessment for Insulin Resistance (HOMA-IR)

HOMA-IR = (Glucose x Insulin)/405
HOMA-IR = Should be < 1.5

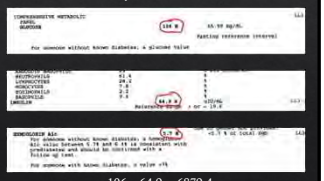
56-year-old female



90 x 2.6 = 234

234/405 = 0.58

52-year-old female



106 x 64.9 = 6879.4

6879.4/405 = 16.9

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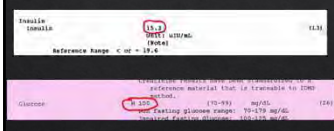
Homeostatic Model Assessment for Insulin Resistance (HOMA-IR)

HOMA-IR = (Glucose x Insulin)/405
HOMA-IR = Should be < 1.5

Normal weight individuals who develop type 2 diabetes: the personal fat threshold

31-year-old female



100 x 15.3 = 1530

1530/405 = 3.78

22-year-old male

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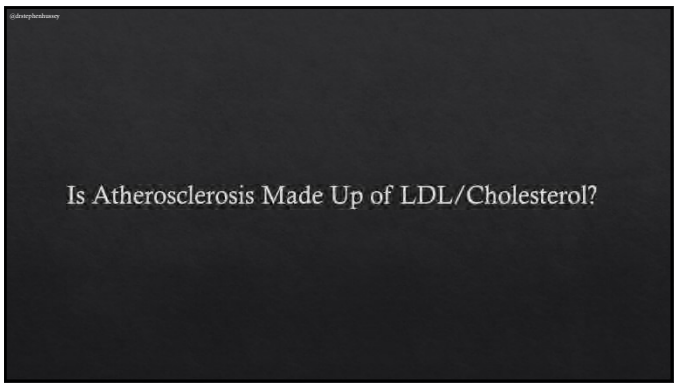
Is Atherosclerosis Made Up of LDL/Cholesterol?

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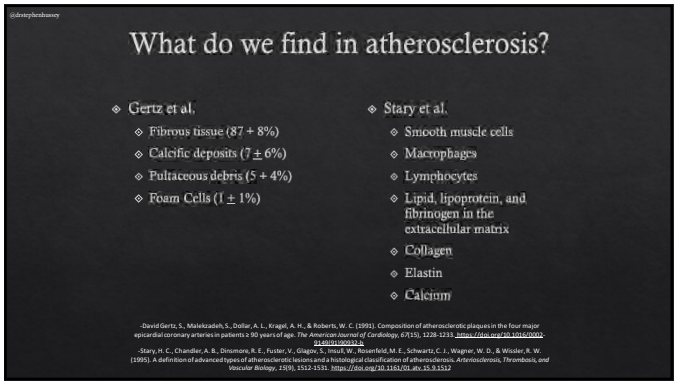
What do we find in atherosclerosis?
Gertz et al.
Fibrous tissue (87 ± 8%)
Calcific deposits (7 ± 6%)
Pultaceous debris (5 ± 4%)
Foam Cells (1 ± 1%)
Stary et al.
Smooth muscle cells
Macrophages
Lymphocytes
Lipid, lipoprotein, and fibrinogen in the extracellular matrix
Collagen
Elastin
Calcium
-David Gertz, S., Malekzadeh, S., Dollar, A. L., Krapel, A. H., & Roberts, W. C. (1991). Composition of atherosclerotic plaques in the four major epicardial coronary arteries in patients ≥ 90 years of age. The American Journal of Cardiology, 67(15), 1228-1233. https://doi.org/10.1016/0002-9149(91)90923-k
-Stary, H. C., Chandler, A. B., Dinsmore, R. E., Fuster, V., Glagov, S., Insull, W., Rosenfeld, M. E., Schwartz, C. J., Wagner, W. D., & Wissler, R. W. (1995). A definition of advanced types of atherosclerotic lesions and a histological classification of atherosclerosis. Arteriosclerosis, Thrombosis, and Vascular Biology, 15(9), 1512-1531. https://doi.org/10.1161/01.atv.15.9.1512

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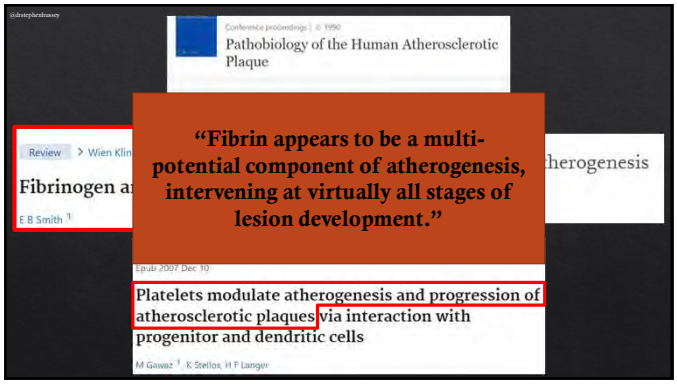
Conference proceedings | © 1990
Pathobiology of the Human Atherosclerotic Plaque
Review
Wien Klin
Fibrinogen a
E B Smith
herogenesis
"Fibrin appears to be a multi-potential component of atherogenesis, intervening at virtually all stages of lesion development."
Epub 2007 Dec 10
Platelets modulate atherogenesis and progression of atherosclerotic plaques via interaction with progenitor and dendritic cells
M Gawaz, K Stellos, H F Langer

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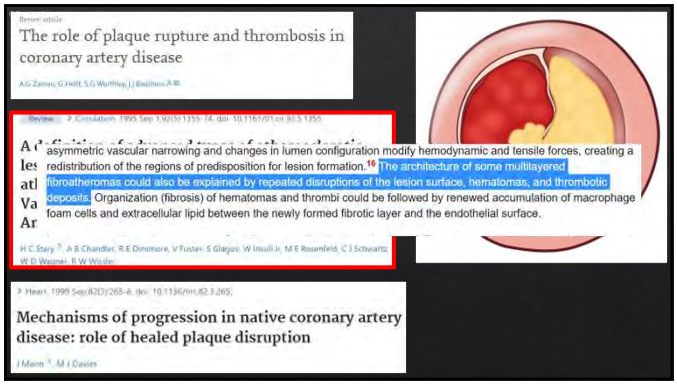
The role of plaque rupture and thrombosis in coronary artery disease
asymmetric vascular narrowing and changes in lumen configuration modify hemodynamic and tensile forces, creating a redistribution of the regions of predisposition for lesion formation.[16] The architecture of some multilayered fibroatheromas could also be explained by repeated disruptions of the lesion surface, hematomas, and thrombotic deposits. Organization (fibrosis) of hematomas and thrombi could be followed by renewed accumulation of macrophage foam cells and extracellular lipid between the newly formed fibrotic layer and the endothelial surface.
Mechanisms of progression in native coronary artery disease: role of healed plaque disruption

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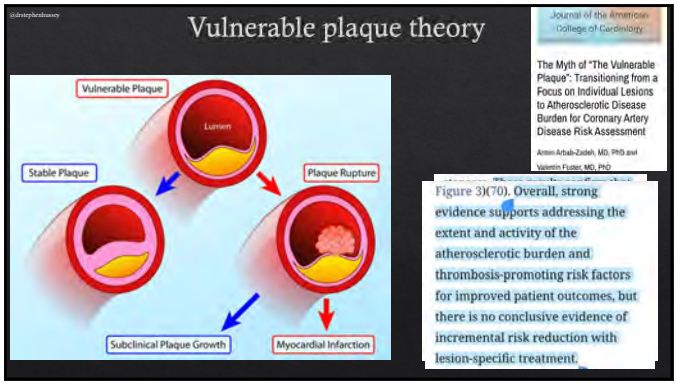
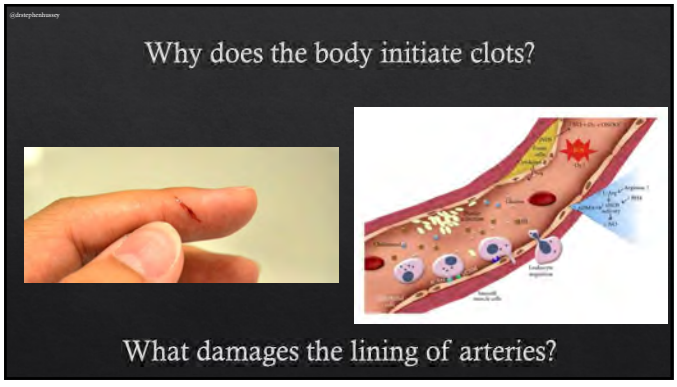
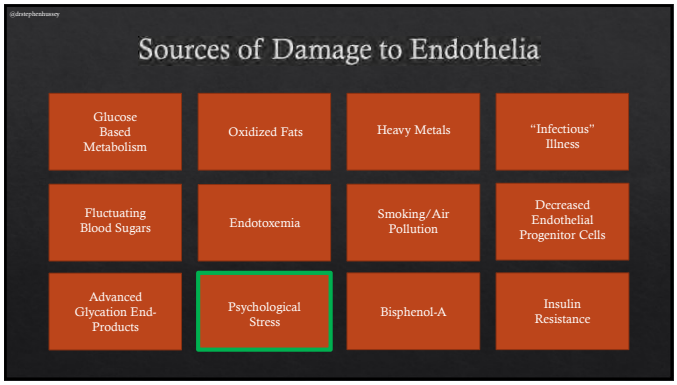

Vulnerable plaque theory
Vulnerable Plaque
Lumen
Stable Plaque
Plaque Rupture
Subclinical Plaque Growth
Myocardial Infarction
Journal of the American College of Cardiology
The Myth of "The Vulnerable Plaque": Transitioning from a Focus on Individual Lesions to Atherosclerotic Disease Burden for Coronary Artery Disease Risk Assessment
Figure 3)(70). Overall, strong evidence supports addressing the extent and activity of the atherosclerotic burden and thrombosis-promoting risk factors for improved patient outcomes, but there is no conclusive evidence of incremental risk reduction with lesion-specific treatment.

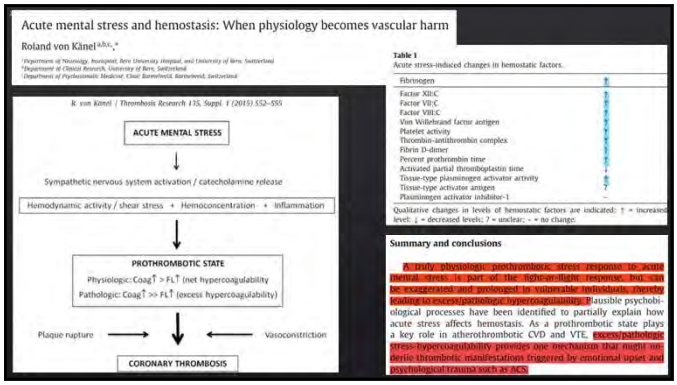
29


Why does the body initiate clots?
What damages the lining of arteries?

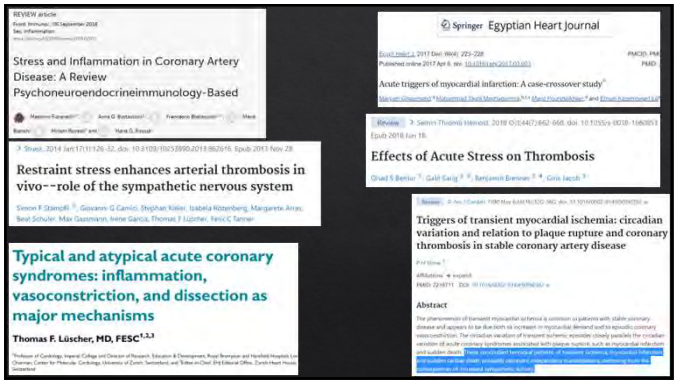
30


Sources of Damage to Endothelia
Glucose Based Metabolism
Oxidized Fats
Heavy Metals
"Infectious" Illness
Fluctuating Blood Sugars
Endotoxemia
Smoking/Air Pollution
Decreased Endothelial Progenitor Cells
Advanced Glycation End-Products
Psychological Stress
Bisphenol-A
Insulin Resistance

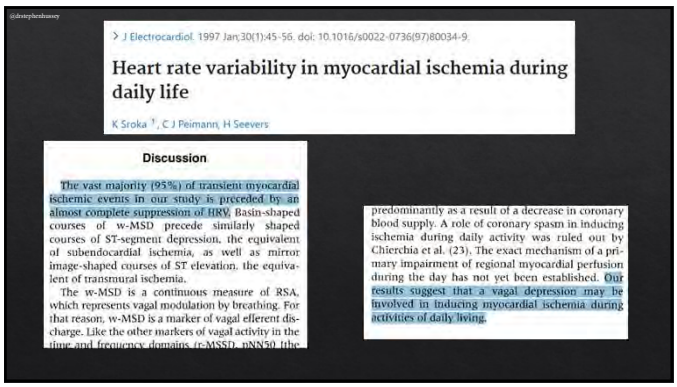
31


Acute mental stress and hemostasis: When physiology becomes vascular harm
Roland von Känel
ACUTE MENTAL STRESS
Sympathetic nervous system activation / catecholamine release
Hemodynamic activity / shear stress + Hemoconcentration + Inflammation
PROTHROMBOTIC STATE
Physiologic: Coag↑ > FL↑ (net hypercoagulability
Pathologic: Coag↑ >> FL↑ (excess hypercoagulability)
Plaque rupture
Vasoconstriction
CORONARY THROMBOSIS
Table 1
Acute stress-induced changes in hemostatic factors.
Summary and conclusions

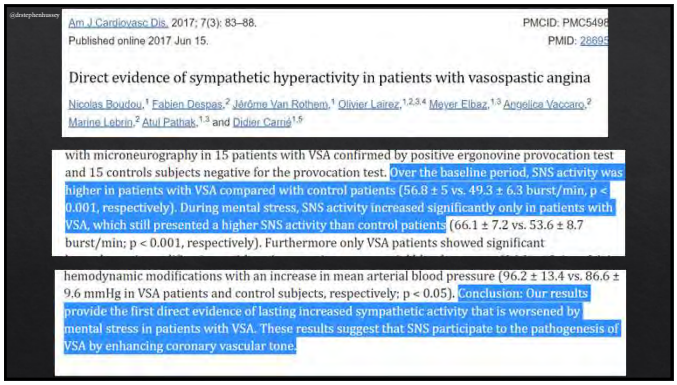
32


Stress and Inflammation in Coronary Artery Disease: A Review Psychoneuroendocrineimmunology-Based
Restraint stress enhances arterial thrombosis in vivo--role of the sympathetic nervous system
Typical and atypical acute coronary syndromes: inflammation, vasoconstriction, and dissection as major mechanisms
Thomas F. Lüscher, MD, FESC
Springer Egyptian Heart Journal
Acute triggers of myocardial infarction: A case-crossover study
Effects of Acute Stress on Thrombosis
Triggers of transient myocardial ischemia: circadian variation and relation to plaque rupture and coronary thrombosis in stable coronary artery disease
Abstract

33


J Electrocardiol. 1997 Jan;30(1):45-56. doi: 10.1016/s0022-0736(97)80034-9.
Heart rate variability in myocardial ischemia during daily life
K Sroka, C J Peimann, H Seevers
Discussion
The vast majority (95%) of transient myocardial ischemic events in our study is preceded by an almost complete suppression of HRV. Basin-shaped courses of w-MSD precede similarly shaped courses of ST-segment depression, the equivalent of subendocardial ischemia, as well as mirror image-shaped courses of ST elevation, the equivalent of transmural ischemia.
The w-MSD is a continuous measure of RSA, which represents vagal modulation by breathing. For that reason, w-MSD is a marker of vagal efferent discharge. Like the other markers of vagal activity in the time and frequency domains (r-MSSD, pNN50, the
predominantly as a result of a decrease in coronary blood supply. A role of coronary spasm in inducing ischemia during daily activity was ruled out by Chierchia et al. (23). The exact mechanism of a primary impairment of regional myocardial perfusion during the day has not yet been established. Our results suggest that a vagal depression may be involved in inducing myocardial ischemia during activities of daily living.

34


Am J Cardiovasc Dis. 2017; 7(3): 83–88.
Published online 2017 Jun 15.
PMCID: PMC5498
PMID: 28695
Direct evidence of sympathetic hyperactivity in patients with vasospastic angina
Nicolas Boudou,[1] Fabien Despas,[2] Jérôme Van Rothem,[1] Olivier Lairez,[1,2,3,4] Meyer Elbaz,[1,3] Angelica Vaccaro,[2] Marine Lebrin,[2] Atul Pathak,[1,3] and Didier Carrié[1,5]
with microneurography in 15 patients with VSA confirmed by positive ergonovine provocation test and 15 controls subjects negative for the provocation test. Over the baseline period, SNS activity was higher in patients with VSA compared with control patients (56.8 ± 5 vs. 49.3 ± 6.3 burst/min, p < 0.001, respectively). During mental stress, SNS activity increased significantly only in patients with VSA, which still presented a higher SNS activity than control patients (66.1 ± 7.2 vs. 53.6 ± 8.7 burst/min; p < 0.001, respectively). Furthermore only VSA patients showed significant
hemodynamic modifications with an increase in mean arterial blood pressure (96.2 ± 13.4 vs. 86.6 ± 9.6 mmHg in VSA patients and control subjects, respectively; p < 0.05). Conclusion: Our results provide the first direct evidence of lasting increased sympathetic activity that is worsened by mental stress in patients with VSA. These results suggest that SNS participate to the pathogenesis of VSA by enhancing coronary vascular tone.

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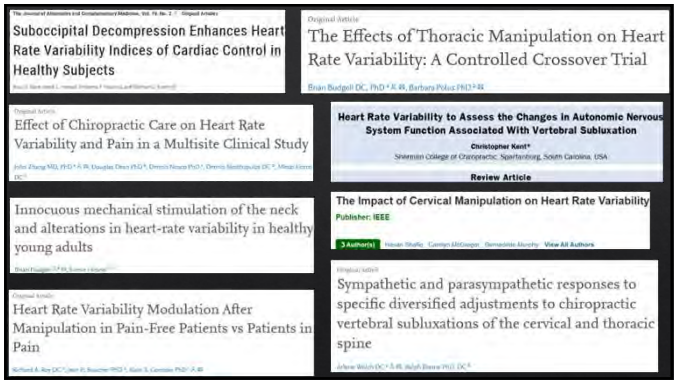
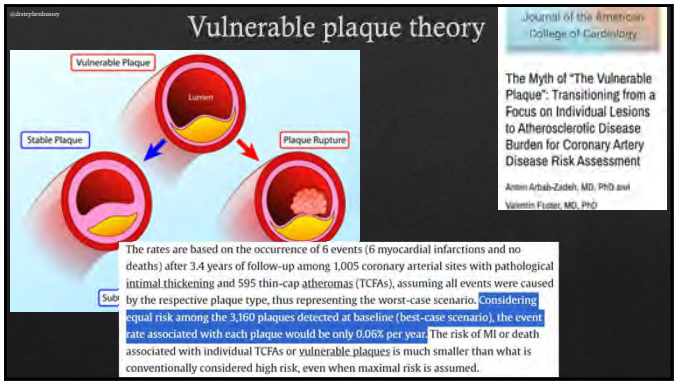
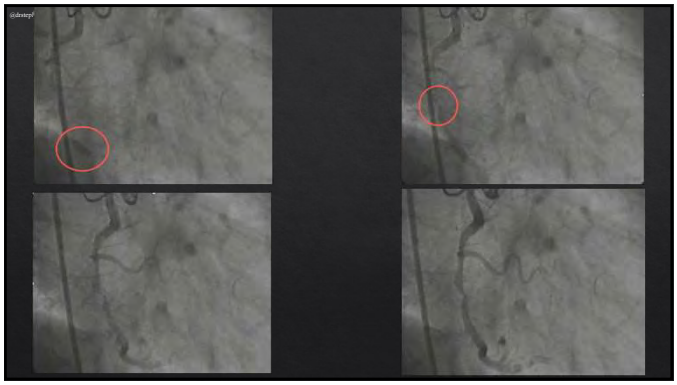

Suboccipital Decompression Enhances Heart Rate Variability Indices of Cardiac Control in Healthy Subjects
The Effects of Thoracic Manipulation on Heart Rate Variability: A Controlled Crossover Trial
Brian Budgell DC, PhD
Effect of Chiropractic Care on Heart Rate Variability and Pain in a Multisite Clinical Study
Heart Rate Variability to Assess the Changes in Autonomic Nervous System Function Associated With Vertebral Subluxation
Christopher Kent*
Review Article
Innocuous mechanical stimulation of the neck and alterations in heart-rate variability in healthy young adults
The Impact of Cervical Manipulation on Heart Rate Variability
Publisher: IEEE
Heart Rate Variability Modulation After Manipulation in Pain-Free Patients vs Patients in Pain
Sympathetic and parasympathetic responses to specific diversified adjustments to chiropractic vertebral subluxations of the cervical and thoracic spine

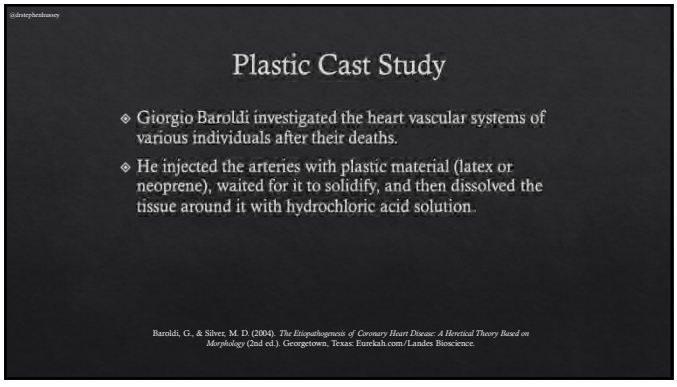
36


Vulnerable plaque theory
Vulnerable Plaque
Lumen
Stable Plaque
Plaque Rupture
Journal of the American College of Cardiology
The Myth of "The Vulnerable Plaque": Transitioning from a Focus on Individual Lesions to Atherosclerotic Disease Burden for Coronary Artery Disease Risk Assessment
Amin Arbab-Zadeh, MD, PhD and
Valentin Fuster, MD, PhD
The rates are based on the occurrence of 6 events (6 myocardial infarctions and no deaths) after 3.4 years of follow-up among 1,005 coronary arterial sites with pathological intimal thickening and 595 thin-cap atheromas (TCFAs), assuming all events were caused by the respective plaque type, thus representing the worst-case scenario. Considering equal risk among the 3,160 plaques detected at baseline (best-case scenario), the event rate associated with each plaque would be only 0.06% per year. The risk of MI or death associated with individual TCFAs or vulnerable plaques is much smaller than what is conventionally considered high risk, even when maximal risk is assumed.

37



38


Plastic Cast Study
Giorgio Baroldi investigated the heart vascular systems of various individuals after their deaths.
He injected the arteries with plastic material (latex or neoprene), waited for it to solidify, and then dissolved the tissue around it with hydrochloric acid solution.
Baroldi, G., & Silver, M. D. (2004). The Etiopathogenesis of Coronary Heart Disease: A Heretical Theory Based on Morphology (2nd ed.). Georgetown, Texas: Eurekah.com/Landes Bioscience.

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Plastic Cast Study

- "In the presence of atherosclerotic stenosis with a lumen/diameter reduction greater than 70% there was a dramatic increase in the diameter and length of collaterals…"
- "**Any** severely obstructed coronary artery lesion, even multiple ones, was **always** found associated with enlarged collaterals."
- "The anastomotic index in these instances ranged from 5 to 33 with a mean value of 16 associated with a single stenosis and 22 in multiple severe stenosis"

Baroldi, G., & Silver, M. D. (2004). *The Etiopathogenesis of Coronary Heart Disease: A Heretical Theory Based on Morphology* (2nd ed.). Georgetown, Texas: Eurekah.com/Landes Bioscience.

40

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Plastic Cast Study – Satellite Collaterals

Baroldi, G., & Silver, M. D. (2004). *The Etiopathogenesis of Coronary Heart Disease: A Heretical Theory Based on Morphology* (2nd ed.). Georgetown, Texas: Eurekah.com/Landes Bioscience.

41

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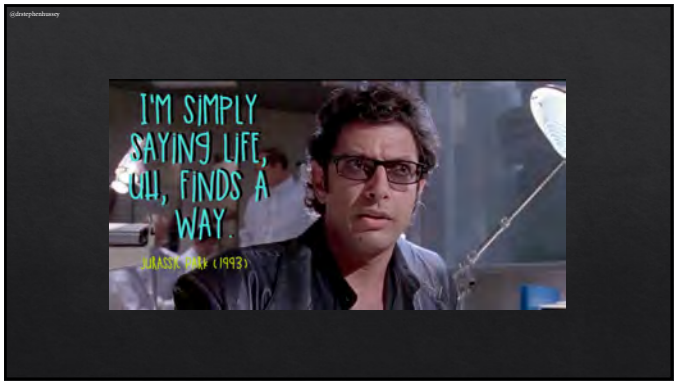
Rapid Growth

- In one study, a stenosis was gradually converted to a complete blockage over 7 days without a heart attack or rhythm problems occurring.
- Another study showed similar findings in only 4 days.

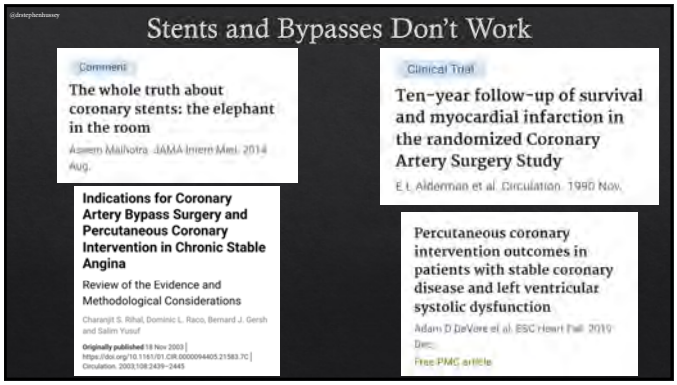
-Khouri EM, et al. : Flow in the major branches of the left coronary artery during experimental coronary insufficiency in the unanesthetized dog. Circulation Res (1968), 23-99

-Schaper W, Pasyk S: Influence of collateral flow on the ischemic tolerance of the heart following acute and subacute coronary occlusion. Circulation (1976), 53 (suppl I): I-57

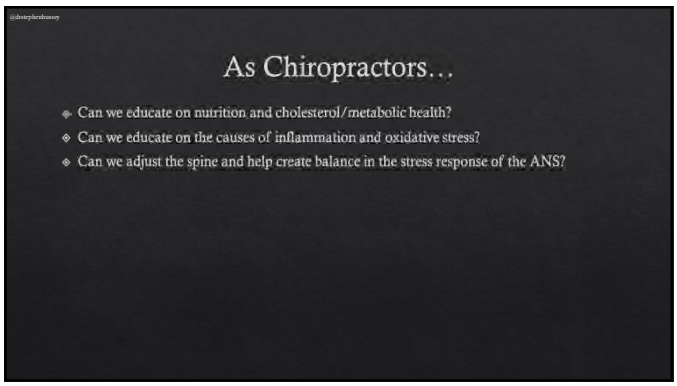
42


I'M SIMPLY SAYING LIFE, UH, FINDS A WAY.
JURASSIC PARK (1993)

43


Stents and Bypasses Don't Work
Comment
The whole truth about coronary stents: the elephant in the room
Aseem Malhotra. JAMA Intern Med. 2014 Aug.
Clinical Trial
Ten-year follow-up of survival and myocardial infarction in the randomized Coronary Artery Surgery Study
E L Alderman et al. Circulation. 1990 Nov.
Indications for Coronary Artery Bypass Surgery and Percutaneous Coronary Intervention in Chronic Stable Angina
Review of the Evidence and Methodological Considerations
Charanjit S. Rihal, Dominic L. Raco, Bernard J. Gersh and Salim Yusuf
Originally published 18 Nov 2003 | https://doi.org/10.1161/01.CIR.0000094405.21583.7C | Circulation. 2003;108:2439–2445
Percutaneous coronary intervention outcomes in patients with stable coronary disease and left ventricular systolic dysfunction
Adam D DeVore et al. ESC Heart Fail. 2019 Dec.
Free PMC article

44


As Chiropractors…
Can we educate on nutrition and cholesterol/metabolic health?
Can we educate on the causes of inflammation and oxidative stress?
Can we adjust the spine and help create balance in the stress response of the ANS?

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RESOURCE YOUR HEALTH
your new path to vitality
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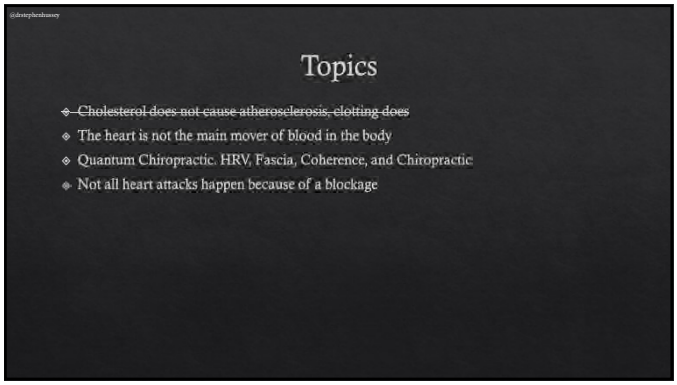
@drstephenhussey
@drstephenhussey
@drstephenhussey
@resourceyourhealth
UNDERSTANDING THE HEART
SURPRISING INSIGHTS INTO THE EVOLUTIONARY ORIGINS OF HEART DISEASE —AND WHY IT MATTERS
DR. STEPHEN HUSSEY, MS, DC

46


@drstephenhussey
Topics
~~Cholesterol does not cause atherosclerosis, clotting does~~
The heart is not the main mover of blood in the body
Quantum Chiropractic. HRV, Fascia, Coherence, and Chiropractic
Not all heart attacks happen because of a blockage

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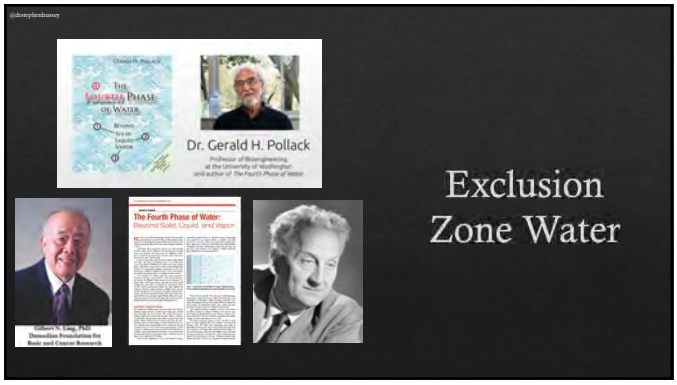
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Dr. Gerald H. Pollack
The Fourth Phase of Water:
Exclusion Zone Water

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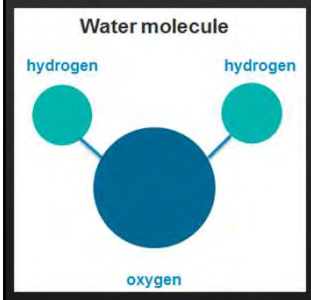
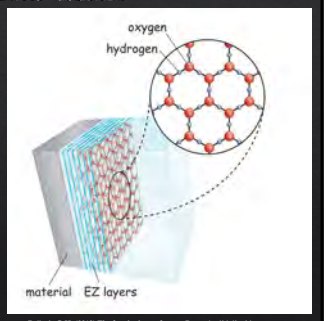
Exclusion Zone Water





Pollack, G.H. (2013) The fourth phase of water: Beyond solid, liquid, and vapor. Seattle, WA. Ebner & sons.

49

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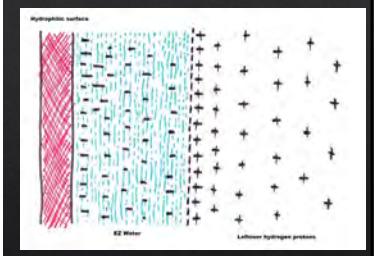
Exclusion Zone Water



Pollack, G.H. (2013) The fourth phase of water: Beyond solid, liquid, and vapor. Seattle, WA. Ebner & sons.

50

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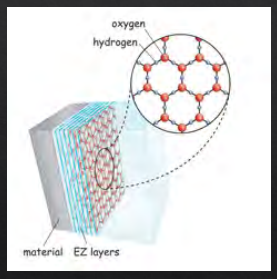
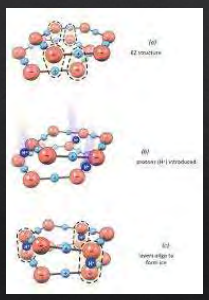
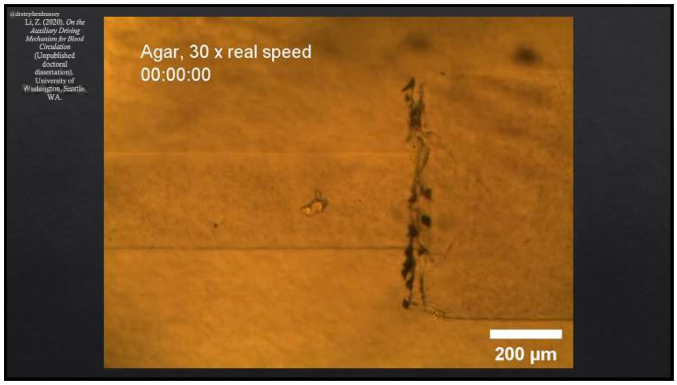
Exclusion Zone Water





Pollack, G.H. (2013) The fourth phase of water: Beyond solid, liquid, and vapor. Seattle, WA. Ebner & sons.

51


@drstephenhussey
Li, Z. (2020). On the Auxiliary Driving Mechanism for Blood Circulation (Unpublished doctoral dissertation). University of Washington, Seattle, WA.
Agar, 30 x real speed
00:00:00
200 µm

52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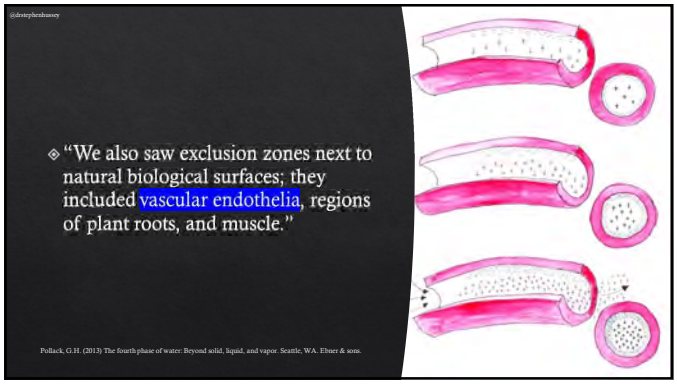
Blood
Of the roughly 50% of blood that is plasma, 92% of it is water.

53


@drstephenhussey
"We also saw exclusion zones next to natural biological surfaces; they included vascular endothelia, regions of plant roots, and muscle."
Pollack, G.H. (2013) The fourth phase of water: Beyond solid, liquid, and vapor. Seattle, WA. Ebner & sons.

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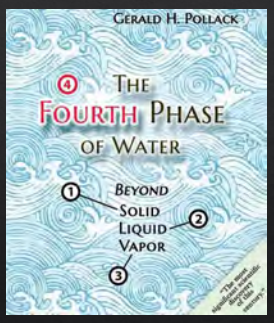
- "Even red blood cells, several strains of bacteria, and ordinary dirt particles scraped from outside our laboratory were excluded. The protein albumin was excluded."



Pollack, G.H. (2013) The fourth phase of water: Beyond solid, liquid, and vapor. Seattle, WA. Ebner & sons.

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Particle Sizes

- Albumin – 3.8 nm in diameter
- RBC – 6000-8000 nm
- LDL – 24-28 nm
- HDL – 7-12 nm
- Sodium Ion – 0.273 nm
- Potassium Ion – 0.25 nm
- Nitric Oxide – 0.115 nm

Hofmeister Series - $Mg^{2+} > Ca^{2+} > Na^{+} > K^{+} > Cl^{-} > NO_3^{-}$

-Toyo, A., & Kimugasa, S. (2012). Mechanisms of Glomerular Albumin Filtration and Tubular Reabsorption. *International Journal of Nephrology, 2012*, 1-9. doi:10.1155/2012/481520
-Mark Winter, University of Sheffield and WebElements Ltd. (n.d.). WebElements Periodic Table » Potassium » radii of atoms and ions. Retrieved from https://www.webelements.com/potassium/atom_sizes.html
-Mark Winter, University of Sheffield and WebElements Ltd. (n.d.). WebElements Periodic Table » Sodium » radii of atoms and ions. Retrieved from https://www.webelements.com/sodium/atom_sizes.html
-German, J. B., Smilowitz, J. T., & Zivkovic, A. M. (2006). Lipoproteins: When size really matters. *Current Opinion in Colloid & Interface Science, 11*(2-3), 171-183. doi:10.1016/j.cocis.2005.11.006

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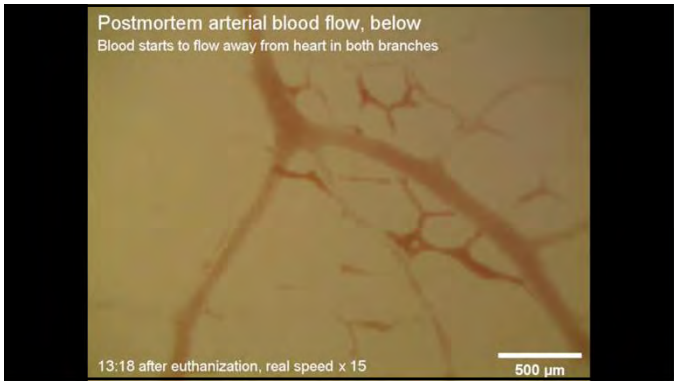
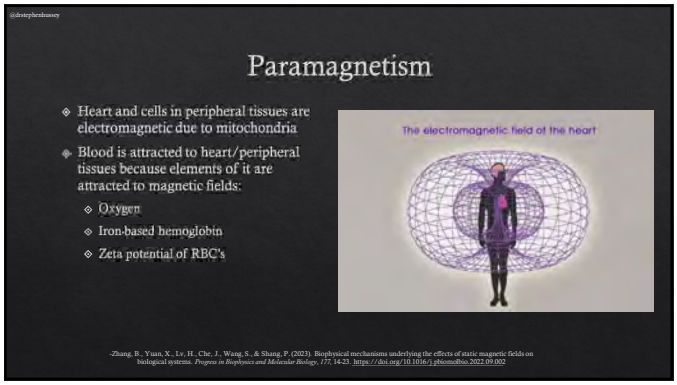
"Flow of this nature cold persist indefinitely if protons and water were continually replenished. If EZs are involved, then proton replenishment is natural, for EZs generate protons continuously so long as an ambient energy remains available to drive their release. The protons immediately form hydronium ions. Those charge water molecules will then move toward regions of lower charge. Hence, *sustained water flow occurs inevitably in almost any scenario involving EZ's and radiant energy.*"

Pollack, G.H. (2013) The fourth phase of water: Beyond solid, liquid, and vapor. Seattle, WA. Ebner & sons.

57


Postmortem arterial blood flow, below
Blood starts to flow away from heart in both branches
13:18 after euthanization, real speed x 15
500 µm

58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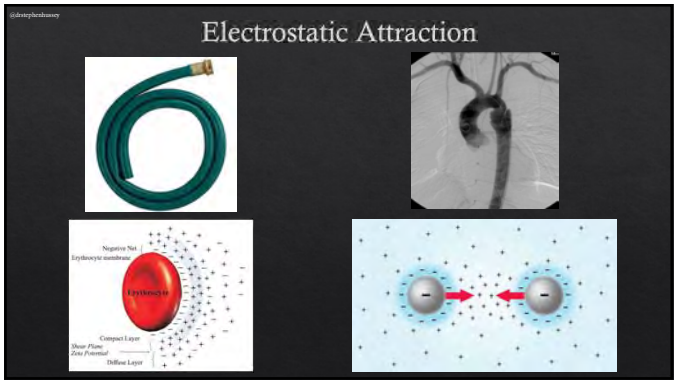
Paramagnetism
Heart and cells in peripheral tissues are electromagnetic due to mitochondria
Blood is attracted to heart/peripheral tissues because elements of it are attracted to magnetic fields:
Oxygen
Iron-based hemoglobin
Zeta potential of RBC's
The electromagnetic field of the heart
-Zhang, B., Yuan, X., Lv, H., Che, J., Wang, S., & Shang, P. (2023). Biophysical mechanisms underlying the effects of static magnetic fields on biological systems. Progress in Biophysics and Molecular Biology, 177, 14-23. https://doi.org/10.1016/j.pbiomolbio.2022.09.002

59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Electrostatic Attraction
Negative Net
Erythrocyte membrane
Erythrocyte
Compact Layer
Shear Plane
Zeta Potential
Diffuse Layer

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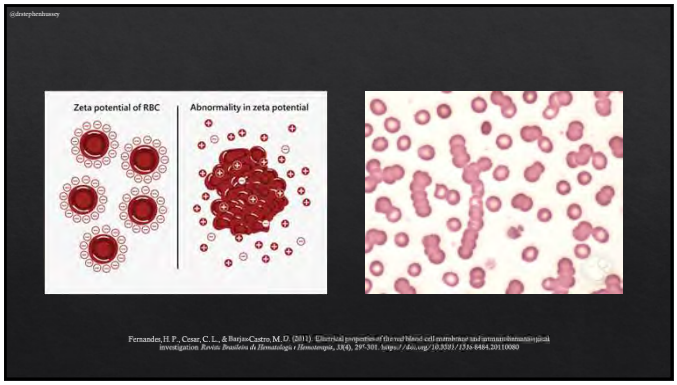
Zeta potential of RBC
Abnormality in zeta potential

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Residence Time in Niches of Stagnant Flow Determines Fibrin Clot Formation in an Arterial Branching Model - Detailed Flow Analysis and Experimental Results
Summary
Hemodynamics associated with atrial fibrillation directly alters thrombotic potential of endothelial cells
attenuated fibrin deposition thickness while increasing fibrin density at the endothelial cell surface. This study suggests that altered hemodynamics associated with AFib play a key role in driving the thrombotic potential of the LAA endothelium.

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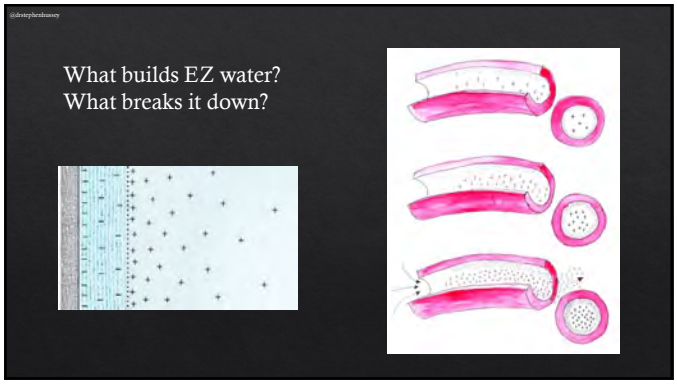
What builds EZ water?
What breaks it down?

63

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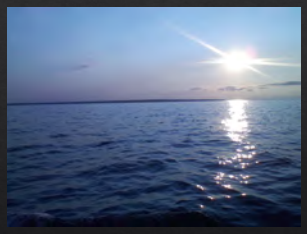
Building EZ

- "Ultraviolet was least effective, visible light more effective, and infrared the most effective, particularly at 3000 nm…..Later we realized that the 3000 nm wavelength is the one most strongly absorbed by water."



Pollack, G.H. (2013) The fourth phase of water: Beyond solid, liquid, and vapor. Seattle, WA. Ebner & sons.

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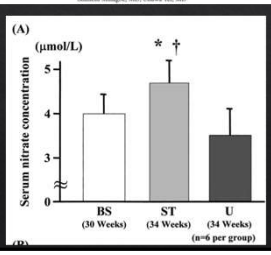
EXPERIMENTAL INVESTIGATIONS

Repeated Sauna Therapy Increases Arterial Endothelial Nitric Oxide Synthase Expression and Nitric Oxide Production in Cardiomyopathic Hamsters



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Repeated Thermal Therapy Improves Impaired Vascular Endothelial Function in Patients With Coronary Risk Factors

Table 2. Changes in Clinical Parameters After Two Weeks of Sauna Treatment

Conclusions. Repeated thermal therapy improves impaired endothelial function in patients with coronary risk factors, suggesting a preventive role for thermal therapy for atherosclerosis.

Hematocrit (%)	47.6 ± 2.9	47.2 ± 2.3	NS
Total cholesterol (mg/dl)	214 ± 44	208 ± 34	NS
Triglyceride (mg/ml)	268 ± 327	221 ± 159	NS
HDL cholesterol (mg/dl)	51 ± 11	50 ± 11	NS
Uric acid (mg/dl)	6.8 ± 1.8	6.6 ± 1.5	NS
Fasting plasma glucose (mg/dl)	99 ± 25	94 ± 16	<0.05
TBARS (nmol/ml)	2.8 ± 0.6	2.9 ± 0.6	NS
Resting arterial diameter (mm)	3.9 ± 0.3	3.9 ± 0.3	NS
Reactive hyperemia (%)	398 ± 170	352 ± 215	NS
%FMD (%)	4.0 ± 1.7	5.8 ± 1.3	<0.001
%NTG (%)	18.7 ± 4.2	18.1 ± 4.1	NS

Values are expressed as the mean ± SD.
HDL cholesterol = high-density lipoprotein cholesterol; TBARS = thiobarbituric acid reactive substances; %FMD = percentage of flow-mediated dilation; %NTG = percentage of nitroglycerin-induced dilation.

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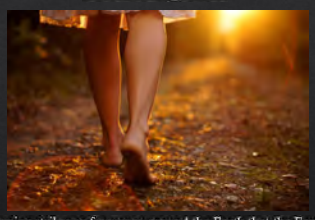
Building EZ



- "Lightening strikes so frequency around the Earth that the Earth's surface cannot dissipate the accumulating negative charge leaving it electronically negative. Standing on the ground, your nose is about 200 volts more positive than your toes."

Pollack, G.H. (2013) The fourth phase of water. Beyond solid, liquid, and vapor. Seattle, WA. Ebner & sons.

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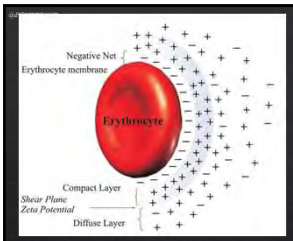


Clinical Trial. J Altern Complement Med. 2013 Feb;19(2):102-10. doi: 10.1089/acm.2011.0820. Epub 2012 Jul 3.

Earthing (grounding) the human body reduces blood viscosity--a major factor in cardiovascular disease

Gaétan Chevalier, Stephen T Sinatra, James L Oschman, Richard M Delany

Affiliations + expand

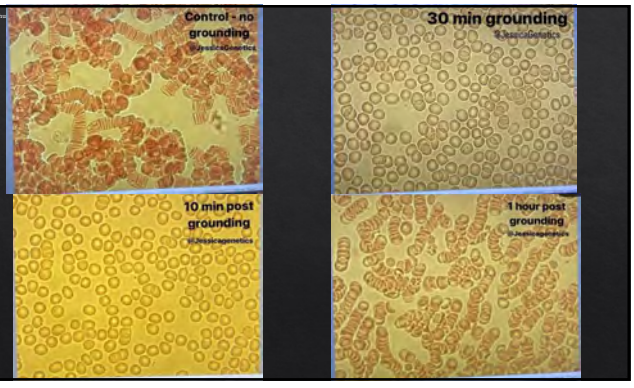
PMID: 22757749 PMCID: PMC3576907 DOI: 10.1089/acm.2011.0820

Results: Earthing or grounding increased zeta potentials in all samples by an average of 2.70 and significantly reduced RBC aggregation.

Conclusions: Grounding increases the surface charge on RBCs and thereby reduces blood viscosity and clumping. Grounding appears to be one of the simplest and yet most profound interventions for helping reduce cardiovascular risk and cardiovascular events.

-Fernandes, H. P., Cesar, C. L., & Barjas-Castro, M. D. (2011). Electrical properties of the red blood cell membrane and immunohematological investigation. *Revista Brasileira de Hematologia e Hemoterapia*, *33*(4), 297-303. https://doi.org/10.5581/1516-8484.20110080

68



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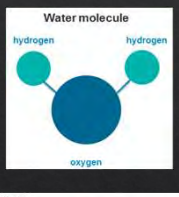
Building EZ water…..

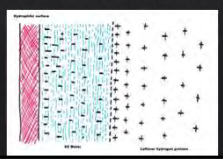
- Light (especially infrared from the sun)
- Grounding
- Human touch
- Vortexing
- Eating Fresh Food
- Infrared Sauna

70

EZ breakdown

- "Suppose some electron-hungry process draws off some of the EZ's negative charge, leaving the released lattice unit devoid of it's usual negativity……Issues of this nature could upset the default situation."





Pollack, G.H. (2013) The fourth phase of water: Beyond solid, liquid, and vapor. Seattle, WA. Ebner & sons.

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"Electron-hungry process" Oxidative Stress

- Properties of Free Radicals
  - Naturally made in the process of burning any fuel source (fat, carbs, protein)
  - Normally neutralized by endogenous antioxidants like glutathione
  - Highly reactive
  - Very short half-life
  - Generate new radicals by chain reaction
  - Cause damage to cells, tissues, and EZ

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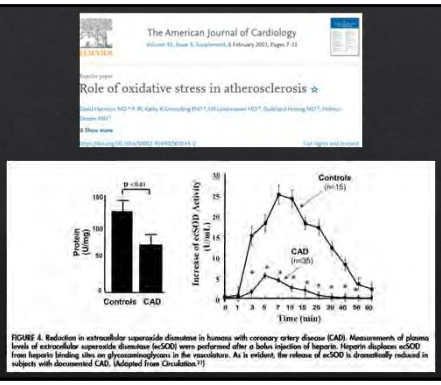

FIGURE 4. Reduction in extracellular superoxide dismutase in humans with coronary artery disease (CAD). Measurements of plasma levels of extracellular superoxide dismutase (ecSOD) were performed after a bolus injection of heparin. Heparin displaces ecSOD from heparin binding sites on glycosaminoglycans in the vasculature. As is evident, the release of ecSOD is dramatically reduced in subjects with documented CAD. (Adopted from Circulation.[31])

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Heart Function

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William Harvey

" I do not believe that the heart is the fashioner of the blood, neither do I imagine that the blood has powers, properties, motion, or heat as the gift of the heart…"

-Harvey W. A second disquisition to John Riolan (Translated by R. Willis). In: Encyclopedia Britannica, Hutchins RM, editors. Great books of the western world. Chicago/London/Toronto: Encyclopedia Britannica: 1952. p. 313-28.

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Johann Ludwig Wilhelm Thudichum

- In a lecture given at the Physiological Section of Medical Society in London concerning the force required to overcome capillary resistance Thudichum states, "if there were no other force promoting circulation than the heart, the heart of a whale would be required in the human chest, to affect even a very slow and languid circulation".

-Thudichum I. On the cause of the emptiness of the arteries after death. Assoc Med J. 1855;3(110):122-7.

76

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- Studying the hemodynamics of the heart PP Sengupta et al. observed that morphological, rheological, and energetic features of the complex three-dimensional helical structure of the heart, with a thin apex, devoid muscular support, suggest the heart is a "poorly designed" pressure-propulsion pump – with low energetic efficiency (10-15%) and ejection fraction (50%).

-Sengupta PP, et al. Left ventricular isovolumic flow sequence during sinus and paced rhythms: new insights from use of high resolution Doppler and ultrasonic digital particle imaging velocimetry. J Am Coll Cardiol. 2007;49(8):899-908.

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- S. Thompson experiments were repeated in the 1960's by L. Manteuffel-Szoege.
- Group 1 – Mechanical ventilation started 30 minutes after the heart stopped and oxygen levels eventually reached 100%.
- Group 2 – Oxygen was insufflated instead of mechanically ventilated 10-15 minutes after the heart stopped and oxygen saturation went from 20-30% to 85%.
- Group 3 – No oxygen was given but dye was injected intravenously and it continued to move for up to 2 hours.
- Manteuffel-Szoege concluded that flow observed in the normal direction against the pressure gradient at the microcirculation suggested that the blood has its "own motor energy".

-Manteuffel-Szoege L, et al. On the possibility of blood circulation continuing after stopping the heart. J Cardiovasc Surg. 1966;7(3):201.

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Leon Manteuffel-Szoege

- Made efforts to "put the heart in its place".
- "A pump sucks in fluid from a reservoir, which is a hydrostatic system and not a hydrodynamic one. The heart is a mechanism inserted into the blood circuit, and so it is a very peculiar kind of pump".

-Manteuffel-Szoege L. Energy sources of blood circulation and the mechanical action of the heart. Thorax. 1960;15(1):47.

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So, What is the Heart?

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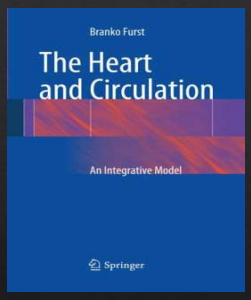

-Furst B. The Heart and Circulation: An Integrative Model.2014. London. Springer-Verlag.

81

Rudolf Steiner

- Argued that the blood does indeed move by itself and that the heart functions as a damming-up organ whose mechanical function could be compared to the flow activated hydraulic ram.

-Steiner R. Introducing anthroposophical medicine: Lecture of March 22 1920, Hudson: Anthroposophic Press; 1999.

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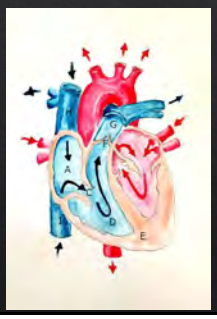
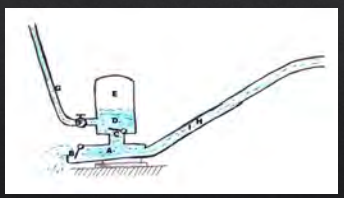
Heart Hydraulic Ram





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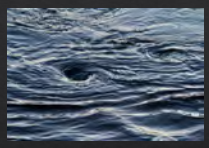
Vortexing



- "EZ contains more oxygen than bulk water. Swirling puts the water into continuous contact with oxygen, both from the air above and the bubbles trapped beneath. Thus, water continuously mixes with oxygen enabling EZ buildup. Furthermore, substances moving past air inevitably become negatively charged and negative charge also promotes EZ buildup."

-Pollack, G.H. (2013) The fourth phase of water: Beyond solid, liquid, and vapor. Seattle, WA. Ebner & sons.

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Da Vinci

- Believed that the heart is a "vessel made of dense muscle" and proposed that vortical flows in the sinuses of Valsalva caused the closure of the aortic valves.

-McMurrich JP. Washington Clo. Leonardo Da Vinci, the anatomist (1452-1519). Vol. 411. Baltimore: Pub. for Carnegie institution of Washington by the Williams & Wilkins Company; 1930.

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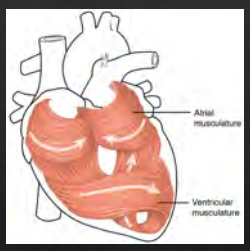
- In 1728, Senac demonstrated that the myocardial fibers are organized in a spiral, three-dimensional arrangement, a finding repeatedly confirmed by investigators over the next 200 years.



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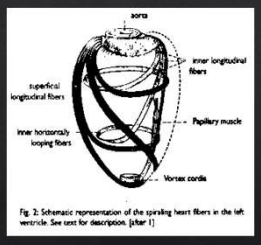

Fig. 2: Schematic representation of the spiraling heart fibers in the left ventricle. See text for description. [after 1]

- In 1864, Socttish anatomist J. Bell Pettigrew noted that fibers of the three inner layers spiral in the opposite directions, from apex to base. The point on inflection of the inner and outer helical system occurs at the apex forming a characteristic whorl or "vortex cordis".

-Pettigrw JB. On the arrangement of the muscular fibers in the ventricles of the vertebrae heart, with physiological remarks. Philos Trans r Soc Lond. 1864; 154:445-500.

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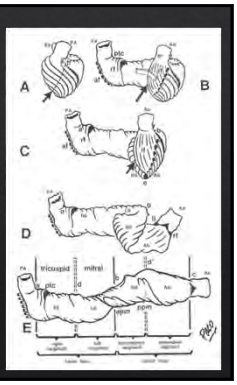
The Structure and Function of the Helical Heart and Its Buttress Wrapping. I. The Normal Macroscopic Structure of the Heart

Francisco Torrent-Guasp, Gerald D. Buckberg, Carmine Clemente, James L. Cox, H. Cecil Coghlan, and Morteza Gharib

(46) The Helical Heart - Paco Torrent-Guasp's Groundbreaking Discovery - YouTube



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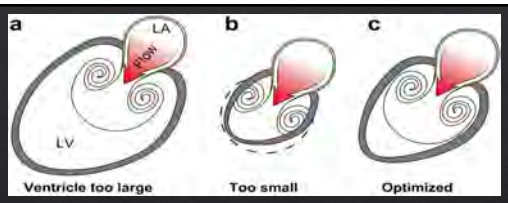

- It has been shown that optimal vortex formation and flow dynamics in left ventricular filling is a marker of healthy myocardial performance.

-Gharib M, et al. Optimal vortex formation as an index of cardiac health. Proc Natl Acad Sci. 2006;103(16):6305-8.

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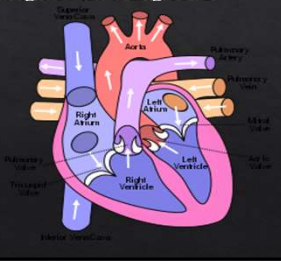
- Interestingly, it has also been shown that the flow of blood from inferior and superior vena cava do not collide, but flow past each other and then form an atrial vortex. A similar occurrence happens in the left atrium and during diastolic filling in the ventricles.



-Kilner PJ, et al. Asymmetric redirection of flow through the heart. Nature. 2000;404:759-61.

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Organ of Impedance

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- Dr. Furst states that, "The existence of muscle pump serves the same purpose as the heart, namely, to "restrain" the massive increase in venous return, with venous valves protecting against the backflow and peripheral congestion. Performance of the heart during exercise is perhaps the best example of the fact that the heart sets itself against the flow of the blood and impedes rather than propels it".

-Furst B, MD. The Heart and Circulation: An Integrative Model. 2014. London. Springer-Verlag.

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Exercise

- Study of the heart during exercise lead Calbet et al. to conclude that "The combined conductance of arms and legs exceeded the pumping capacity of the heart…implying that muscular vasodilatory response during maximal exercise must be restrained to maintain perfusion pressure".

-Calbet JAL, et al. Maximal muscular vascular conductances during whole body upright exercise in humans. J Physiol. 2004;558(1):319-31.

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Aerobic Fitness

- Compared to age-matched, non-trained individuals, professional soccer players have a reduced angle of left ventricular twist and torsion velocities at rest, suggesting that larger hearts, with more inertia, interrupt the flow of blow more efficiently.

-Zocalo Y, et al. Assessment of training-dependent changes in the left ventricle torsion dynamics of professional soccer players using speckle-tracking echocardiography. In: Engineering in Medicine and Biology Society, 2007. EMBS 2007. 29th annual international conference of the IEEE. 2007. Lyon: IEEE.

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- "Only when seen as an organ of impedance can the heart place itself effectively against the "runaway train" of oncoming blood to generate only moderately increased MAP even during maximal exercise….this mechanism allows the heart to maintain normal dimensions and protect it from overdistention in the face of greatly increased blood flow ("cardiac throughput")."

-Furst, B. (2014). The Heart and Circulation: An Integrative Model. London: Springer-Verlag.

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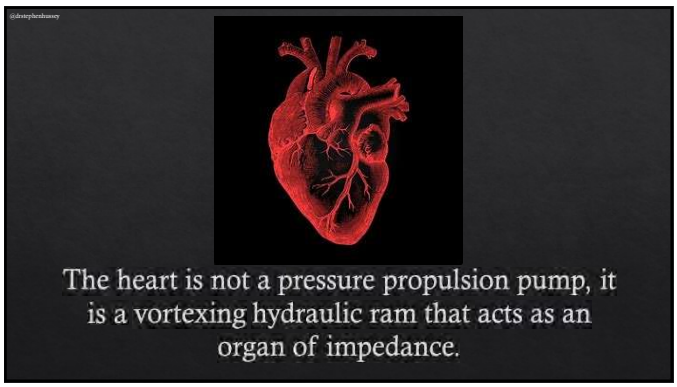
The heart is not a pressure propulsion pump, it is a vortexing hydraulic ram that acts as an organ of impedance.

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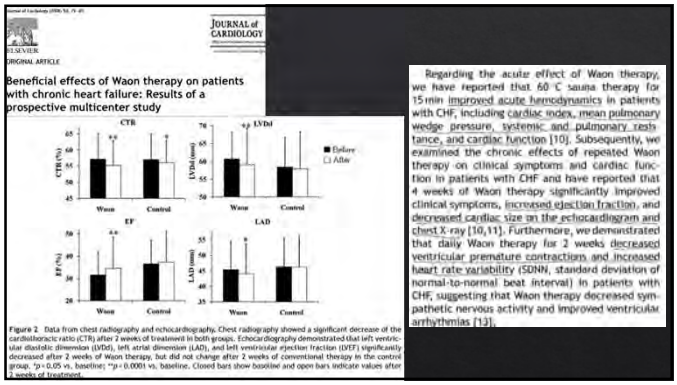
JOURNAL of CARDIOLOGY
ELSEVIER
ORIGINAL ARTICLE
Beneficial effects of Waon therapy on patients with chronic heart failure: Results of a prospective multicenter study
CTR
LVDd
EF
LAD
Before
After
Waon
Control
Figure 2 Data from chest radiography and echocardiography. Chest radiography showed a significant decrease of the cardiothoracic ratio (CTR) after 2 weeks of treatment in both groups. Echocardiography demonstrated that left ventricular diastolic dimension (LVDd), left atrial dimension (LAD), and left ventricular ejection fraction (LVEF) significantly decreased after 2 weeks of Waon therapy, but did not change after 2 weeks of conventional therapy in the control group. *p < 0.05 vs. baseline; **p < 0.0001 vs. baseline. Closed bars show baseline and open bars indicate values after 2 weeks of treatment.
Regarding the acute effect of Waon therapy, we have reported that 60 °C sauna therapy for 15 min improved acute hemodynamics in patients with CHF, including cardiac index, mean pulmonary wedge pressure, systemic and pulmonary resistance, and cardiac function [10]. Subsequently, we examined the chronic effects of repeated Waon therapy on clinical symptoms and cardiac function in patients with CHF and have reported that 4 weeks of Waon therapy significantly improved clinical symptoms, increased ejection fraction, and decreased cardiac size on the echocardiogram and chest X-ray [10,11]. Furthermore, we demonstrated that daily Waon therapy for 2 weeks decreased ventricular premature contractions and increased heart rate variability (SDNN, standard deviation of normal-to-normal beat interval) in patients with CHF, suggesting that Waon therapy decreased sympathetic nervous activity and improved ventricular arrhythmias [13].

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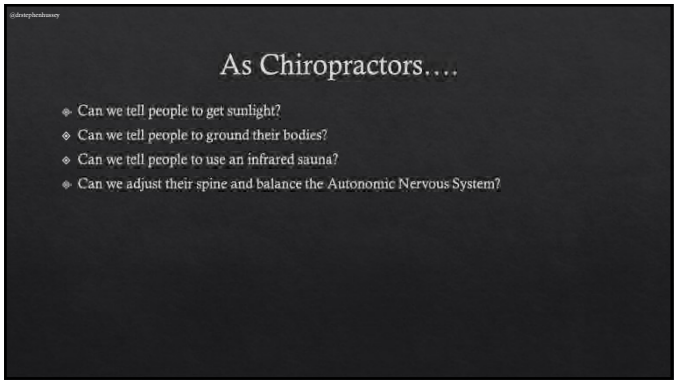
As Chiropractors….
Can we tell people to get sunlight?
Can we tell people to ground their bodies?
Can we tell people to use an infrared sauna?
Can we adjust their spine and balance the Autonomic Nervous System?

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RESOURCE YOUR HEALTH
your new path to vitality
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UNDERSTANDING THE HEART
SURPRISING INSIGHTS INTO THE EVOLUTIONARY ORIGINS OF HEART DISEASE —AND WHY IT MATTERS
DR. STEPHEN HUSSEY, MS, DC

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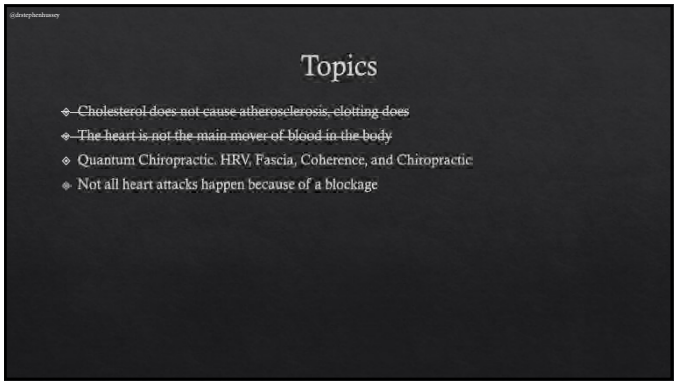
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Topics
Cholesterol does not cause atherosclerosis, clotting does
The heart is not the main mover of blood in the body
Quantum Chiropractic. HRV, Fascia, Coherence, and Chiropractic
Not all heart attacks happen because of a blockage

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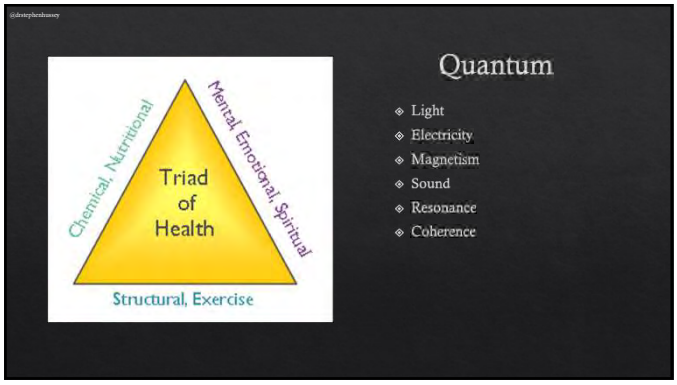
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Chemical, Nutritional
Mental, Emotional, Spiritual
Triad of Health
Structural, Exercise
Quantum
Light
Electricity
Magnetism
Sound
Resonance
Coherence

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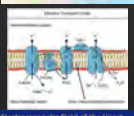
Mitochondria

- Heart tissue is one of the densest with mitochondria (~5000 per cell)
- Heart muscle tissue prefers fatty acids and ketones (more ATP)
- Presence of ketones has been shown to increase mitochondrial respiration, oxidative phosphorylation, by 128%
- Food is only 1/3 of how mitochondria get electrons, there are many other ways to optimize mitochondria
- Don't let your ETC's get stretched out!
- Mitochondria, especially when efficient and healthy, create a magnetic field.
- This is critical for coherence.



-Walton, C. M., et al. (2020). Ketones elicit distinct alterations in adipose mitochondrial Bioenergetics. International Journal of Molecular Sciences, 21(17), 6255. https://doi.org/10.3390/ijms21176255

-Schaper, J., Meiser, E., & Stämmler, G. (1985). Ultrastructural morphometric analysis of myocardium from dogs, rats, hamsters, mice, and from human hearts. *Circulation Research*, *56*(3), 377-391. https://doi.org/10.1161/01.res.56.3.377

-Tian, R., et al. (2019). Unlocking the secrets of mitochondria in the cardiovascular system. *Circulation*, *140*(14), 1205-1216. https://doi.org/10.1161/circulationaha.119.040853

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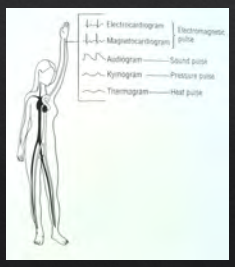
The Heart Also Communicates Through Blood

- The conduction signal of heartbeat not only travels through the heart but is conducted by ionic minerals in blood that carry the charge throughout the entire body.
- This is why signals recorded by electrocardiograms can be picked up anywhere on the skin.
- Electromagnetic pulse is first (electrocardiogram and magnetocardiogram)
- Then heart sounds (audiogram), a wave of pressure (kymogram), and then a temperature change from infrared radiation (thermogram).



-Schwartz, G. E. (1996). Energy cardiology: A dynamical energy systems approach for integrating conventional and alternative medicine. *Journal of Mind-Body Health*, *12*, 4-24. https://www.semanticscholar.org/paper/Energy-cardiology%3A-A-dynamical-energy-systems-for-Schwartz/ca8cda2b64c4934ac1f9bd835a857a1d8c06e4df

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Coherence

- Healthy connections between aspects of a biological system demonstrate coherence.
- For example, this can be seen in the relationship between the heartbeat and breathing, as well as in variations in metabolism.
- Healthy coherence is essentially the ability of all aspects of living things to intercommunicate so that all aspects of the system are on the same page and are functioning as a whole.
- Because the hearts electric field is 60 times stronger than the brains, and its magnetic field is 5000 times stronger than the brains, it is the only electromagnetic field large enough to "touch" or "sense" every cell in the body.
- This means that the heart is what monitors the body to detect coherence and then, in turn, relays coherence to the entire body. Heart coherence is measured via heart rate variability (HRV).

-Breithaupt, H. Biological Rhythms and Communications. In Elektromagnetic *Bio-Information*, 2nd ed. (F.A. Popp, R. Warnke, H.L Konig and W. Peschke, eds) Urban and Schwarzenberg, Munchen, 1989, pp. 18-41.

-Song, L. Z., Schwartz, G. E., & Russek, L. G. (1998). Heart-focused attention and heart-brain synchronization: energetic and physiological mechanisms. *Alternative therapies in health and medicine*, *4*(5), 54-63. https://pubmed.ncbi.nlm.nih.gov/9729592/

-Childre, D., & Martin, H. (2011). *The HeartMath solution: The institute of HeartMath's revolutionary program for engaging the power of the heart's intelligence*. HarperCollins.

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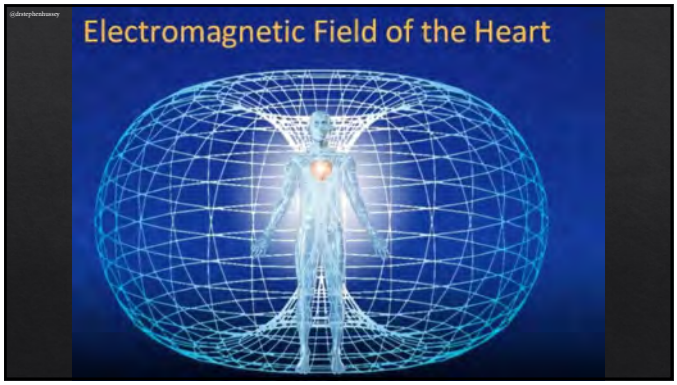
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Electromagnetic Field of the Heart

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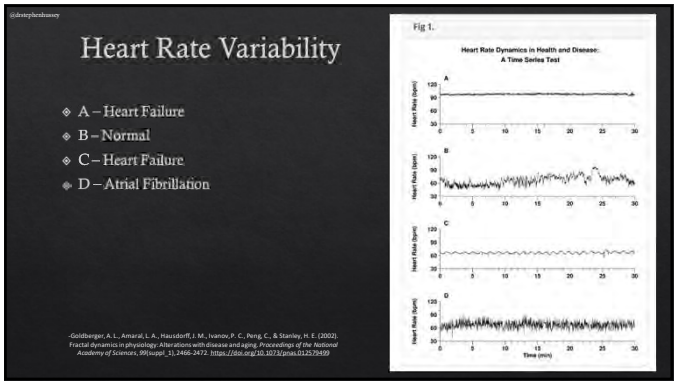
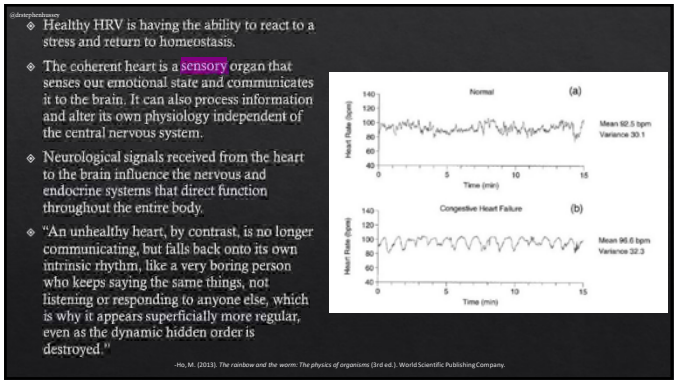

@drstephenhussey
Heart Rate Variability
A – Heart Failure
B – Normal
C – Heart Failure
D – Atrial Fibrillation
-Goldberger, A. L., Amaral, L. A., Hausdorff, J. M., Ivanov, P. C., Peng, C., & Stanley, H. E. (2002). Fractal dynamics in physiology: Alterations with disease and aging. Proceedings of the National Academy of Sciences, 99(suppl_1), 2466-2472. https://doi.org/10.1073/pnas.012579499
Fig 1.
Heart Rate Dynamics in Health and Disease: A Time Series Test
A
B
C
D
Heart Rate (bpm)
Time (min)

107


@drstephenhussey
Healthy HRV is having the ability to react to a stress and return to homeostasis.
The coherent heart is a sensory organ that senses our emotional state and communicates it to the brain. It can also process information and alter its own physiology independent of the central nervous system.
Neurological signals received from the heart to the brain influence the nervous and endocrine systems that direct function throughout the entire body.
"An unhealthy heart, by contrast, is no longer communicating, but falls back onto its own intrinsic rhythm, like a very boring person who keeps saying the same things, not listening or responding to anyone else, which is why it appears superficially more regular, even as the dynamic hidden order is destroyed."
Normal
(a)
Mean 82.5 bpm
Variance 30.1
Congestive Heart Failure
(b)
Mean 96.6 bpm
Variance 32.3
Heart Rate (bpm)
Time (min)
-Ho, M. (2013). The rainbow and the worm: The physics of organisms (3rd ed.). World Scientific Publishing Company.

108

@drstephenhussey

How Do We Create Coherence?

- Researchers have identified six different heart rhythms associated with expressing different emotions or emotional states.
- Only 'love and appreciation' create full coherence. Frustration and resentment create incoherence.
- There's a reason we seem to connect our hearts to our emotional state in the things we say.

-McCraty, R., et al. The coherent heart: Heart-brain interactions, Psychophysiological coherence, and the emergence of system-wide order. (2006).

109

@drstephenhussey

Other Ways to Create Coherence

- Release stored or unresolved trauma
- Change your perspective on feelings of frustration and resentment
- Get nature exposure (sunlight, nature sounds)
- Do some grounding/earthing
- Cold exposure (ice baths, bold showers, natural bodies of water, dunk face in cold water)
- Minimize nnEMF exposure (wi-fi, 5G, cell phones, etc.)
- Minimize processed blue light exposure
- Balance your Circadian rhythm (watch sunrise and sunset, reduce blue light at night)
- Cultivate positive loving relationships
- Chiropractic!

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Connective Tissue

- Fascia, Collagen, Interstitium, Tensegrity System, Living Matrix, etc.
- Framework of the entire body, its what holds us together.
- But it is much, much more than that.

-Myers, T. Tensegrity Continuum, *Massage* 1995; 5/99-92-108.

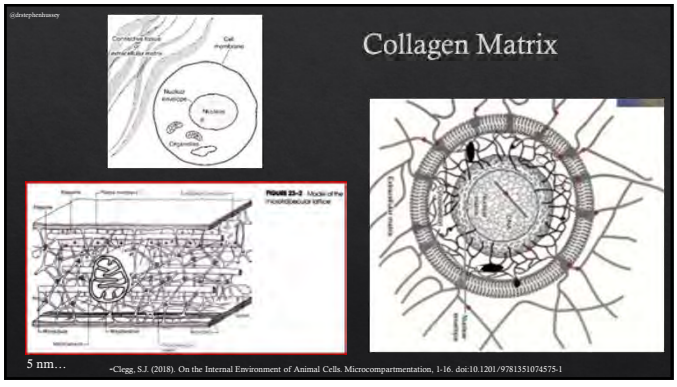
111


gilhedley.com
The collagenous fibrous

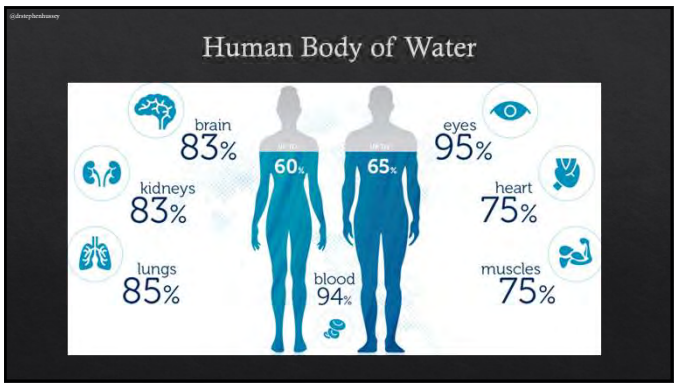
112


@drstephenhussey
EV

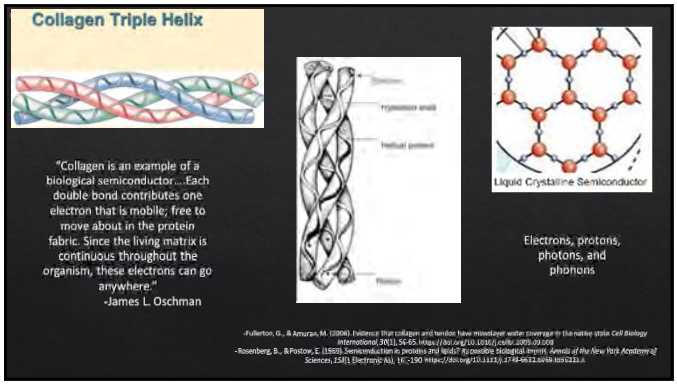
113


@drstephenhussey
Collagen Matrix
5 nm…
-Clegg, S.J. (2018). On the Internal Environment of Animal Cells. Microcompartmentation, 1-16. doi:10.1201/9781351074575-1

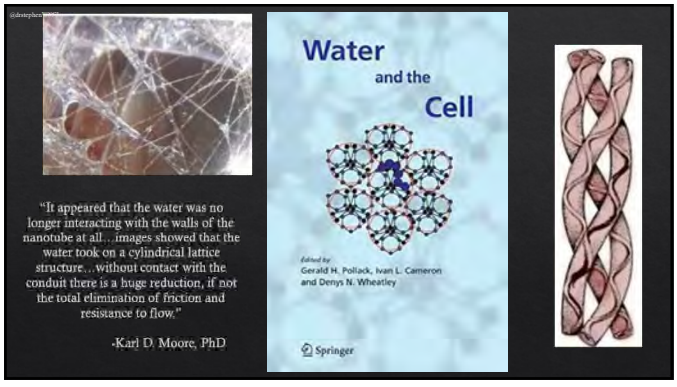
114


Human Body of Water
brain
83%
kidneys
83%
lungs
85%
60%
65%
blood
94%
eyes
95%
heart
75%
muscles
75%

115


Collagen Triple Helix
"Collagen is an example of a biological semiconductor…Each double bond contributes one electron that is mobile; free to move about in the protein fabric. Since the living matrix is continuous throughout the organism, these electrons can go anywhere."
-James L. Oschman
Liquid Crystalline Semiconductor
Electrons, protons, photons, and phonons

116


"It appeared that the water was no longer interacting with the walls of the nanotube at all…images showed that the water took on a cylindrical lattice structure…without contact with the conduit there is a huge reduction, if not the total elimination of friction and resistance to flow."
-Karl D. Moore, PhD
Water
and the
Cell
Gerald H. Pollack, Ivan L. Cameron and Denys N. Wheatley
Springer

117

Faster Than the Nervous System

An Anatomical, Biochemical, Biophysical and Quantum Basis for the Unconscious Mind

Activation of neutrophils by a chemically separated but optically coupled neutrophil population undergoing respiratory burst

Rudimentary form of cellular "vision"

G Albrecht-Buehler [1]

Affiliations + expand

PMID: 1518860 PMCID: PMC49903 DOI: 10.1073/pnas.89.17.8288

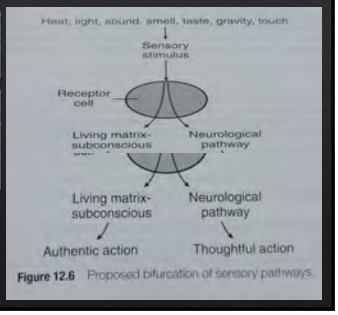


Figure 12.6 Proposed bifurcation of sensory pathways.

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Collagen VI in healthy and diseased nervous system

Ilaria Gregorio, Paola Braghetta, Paolo Bonaldo, Matilde Cescon

The Role of Collagens in Peripheral Nerve Myelination and Function

Peiwen Chen [1], Matilde Cescon, Paolo Bonaldo

Affiliations + expand

PMID: 25143238 DOI: 10.1007/s12035-014-8862-y

The CNS/PNS Extracellular Matrix Provides Instructive Guidance Cues to Neural Cells and Neuroregulatory Proteins in Neural Development and Repair

James Mellows [1 2 3 4], Anthony J. Hayes [5] and Gregory Bix [6]

Novel roles for collagens in wiring the vertebrate nervous system

Michael A Fox

Which form of collagen is suitable for nerve cell culture?

Mohsen Fathi Najafi, PhD,[1] Babak Zahri,[2] Fatemeh Vahedi,[1] Leila Esmaillian Toosy [3] and Nazila Ariaee, MSc[2,3]

Collagens as New Players in Nervous System Diseases

Anne Heikkinen, Michael A. Fox & Taina Pihlajaniemi

Chapter | First Online: 16 May 2021

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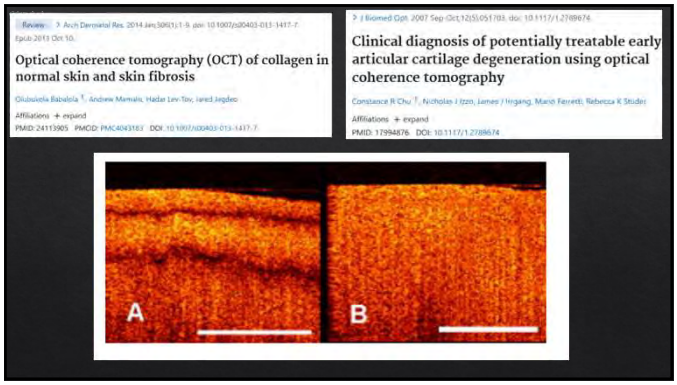
What Damages Fascia?

Stasis, Dehydration, Inflammation

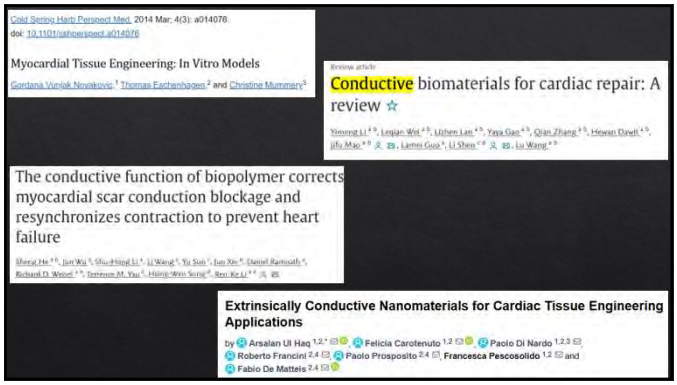
-Gil Hedley

What Happens with Loss of Properties of Healthy Fascia?

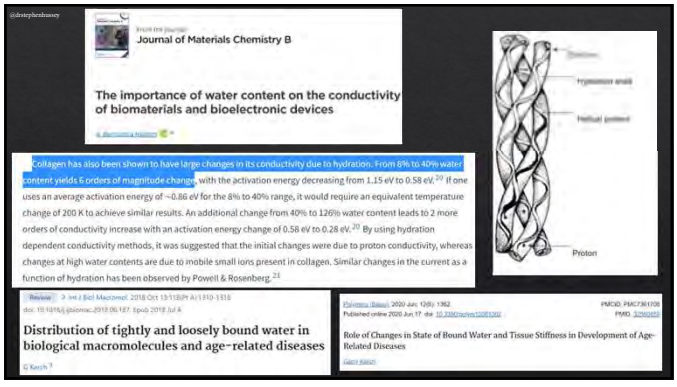
120


Optical coherence tomography (OCT) of collagen in normal skin and skin fibrosis
Clinical diagnosis of potentially treatable early articular cartilage degeneration using optical coherence tomography
A
B

121

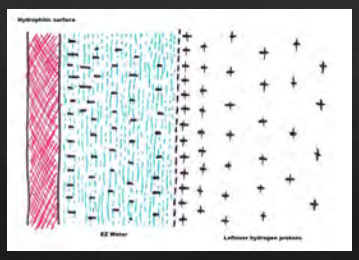

Myocardial Tissue Engineering: In Vitro Models
Conductive biomaterials for cardiac repair: A review ☆
The conductive function of biopolymer corrects myocardial scar conduction blockage and resynchronizes contraction to prevent heart failure
Extrinsically Conductive Nanomaterials for Cardiac Tissue Engineering Applications

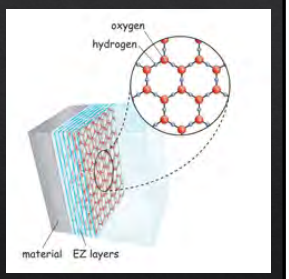
122


Journal of Materials Chemistry B
The importance of water content on the conductivity of biomaterials and bioelectronic devices
Collagen has also been shown to have large changes in its conductivity due to hydration. From 8% to 40% water content yields 6 orders of magnitude change with the activation energy decreasing from 1.15 eV to 0.58 eV.[20] If one uses an average activation energy of ~0.86 eV for the 8% to 40% range, it would require an equivalent temperature change of 200 K to achieve similar results. An additional change from 40% to 126% water content leads to 2 more orders of conductivity increase with an activation energy change of 0.58 eV to 0.28 eV.[20] By using hydration dependent conductivity methods, it was suggested that the initial changes were due to proton conductivity, whereas changes at high water contents are due to mobile small ions present in collagen. Similar changes in the current as a function of hydration has been observed by Powell & Rosenberg.[21]
Proton
Distribution of tightly and loosely bound water in biological macromolecules and age-related diseases
Role of Changes in State of Bound Water and Tissue Stiffness in Development of Age-Related Diseases

123

Exclusion Zone Water

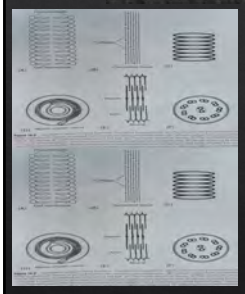




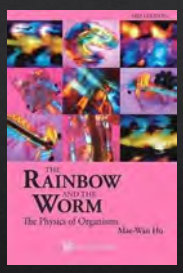
Pollack, G.H. (2013) The fourth phase of water: Beyond solid, liquid, and vapor. Seattle, WA. Ebner & sons.

124

Fourth Phase Water is a Liquid Crystal



Liquid crystals have unique ability to interact with light, heat, pressure, sound, electricity, gamma rays, cosmic rays, microwaves, bioelectricity, biophotons….



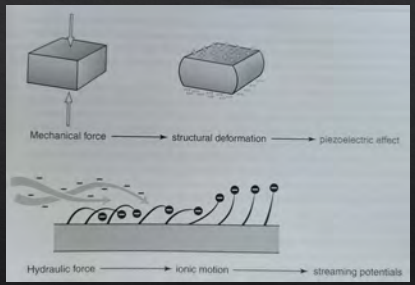
Have Piezoelectric Properties

-Bouligand, Y. (1978). Liquid crystals and their analogs in biological systems. *Liquid Crystals*, 259-294. https://doi.org/10.1016/b978-0-12-607724-2.50012-4

-Safinya, C. R., Deek, J., Beck, R., Jones, J. B., Leal, C., Ewert, K. K., & Li, Y. (2013). Liquid crystal assemblies in biologically inspired systems. *Liquid Crystals*, 40(12), 1748-1758. https://doi.org/10.1080/02678292.2013.846422

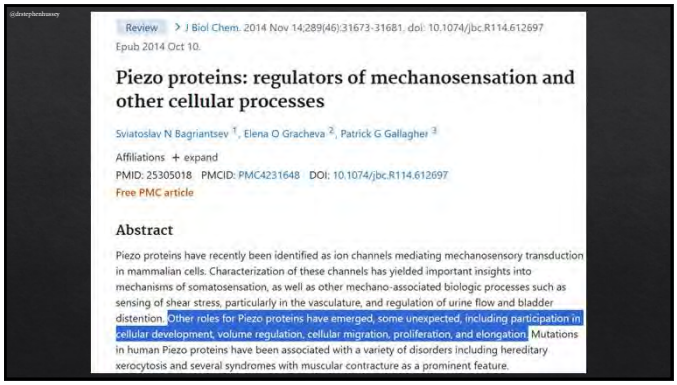
125

Piezoelectricity

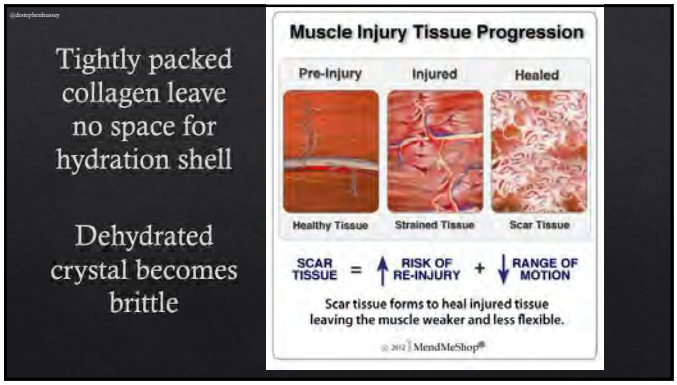


-MacGinitie, L. A. (1995). Streaming and piezoelectric potentials in connective tissues. *Electromagnetic Fields*, 125-142. https://doi.org/10.1021/bk-1995-0250.ch008

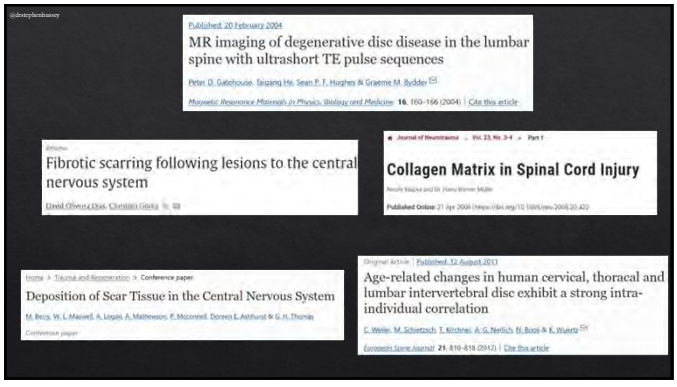
126


Review
J Biol Chem. 2014 Nov 14;289(46):31673-31681. doi: 10.1074/jbc.R114.612697
Epub 2014 Oct 10.
Piezo proteins: regulators of mechanosensation and other cellular processes
Sviatoslav N Bagriantsev, Elena O Gracheva, Patrick G Gallagher
Affiliations + expand
PMID: 25305018 PMCID: PMC4231648 DOI: 10.1074/jbc.R114.612697
Free PMC article
Abstract
Piezo proteins have recently been identified as ion channels mediating mechanosensory transduction in mammalian cells. Characterization of these channels has yielded important insights into mechanisms of somatosensation, as well as other mechano-associated biologic processes such as sensing of shear stress, particularly in the vasculature, and regulation of urine flow and bladder distention. Other roles for Piezo proteins have emerged, some unexpected, including participation in cellular development, volume regulation, cellular migration, proliferation, and elongation. Mutations in human Piezo proteins have been associated with a variety of disorders including hereditary xerocytosis and several syndromes with muscular contracture as a prominent feature.

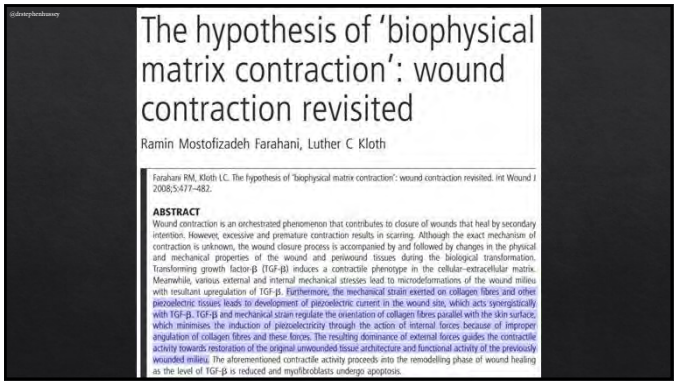
127


Tightly packed collagen leave no space for hydration shell
Dehydrated crystal becomes brittle
Muscle Injury Tissue Progression
Pre-Injury
Injured
Healed
Healthy Tissue
Strained Tissue
Scar Tissue
SCAR TISSUE = RISK OF RE-INJURY + RANGE OF MOTION
Scar tissue forms to heal injured tissue leaving the muscle weaker and less flexible.
MendMeShop

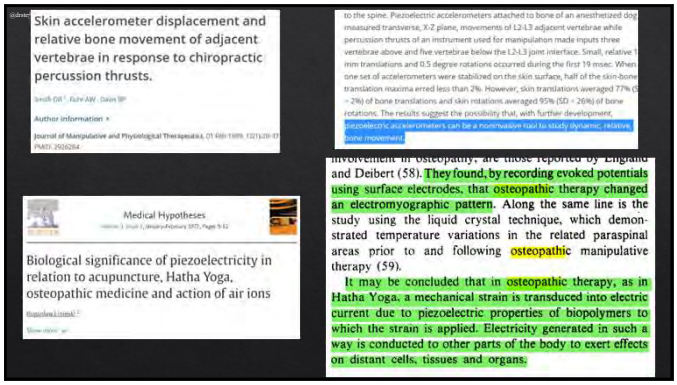
128


Published: 20 February 2004
MR imaging of degenerative disc disease in the lumbar spine with ultrashort TE pulse sequences
Fibrotic scarring following lesions to the central nervous system
Collagen Matrix in Spinal Cord Injury
Deposition of Scar Tissue in the Central Nervous System
Age-related changes in human cervical, thoracal and lumbar intervertebral disc exhibit a strong intra-individual correlation

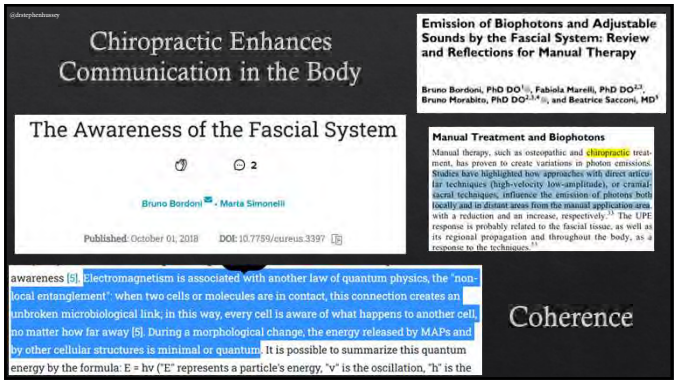
129


The hypothesis of 'biophysical matrix contraction': wound contraction revisited
Ramin Mostofizadeh Farahani, Luther C Kloth
Farahani RM, Kloth LC. The hypothesis of 'biophysical matrix contraction': wound contraction revisited. Int Wound J 2008;5:477–482.
ABSTRACT
Wound contraction is an orchestrated phenomenon that contributes to closure of wounds that heal by secondary intention. However, excessive and premature contraction results in scarring. Although the exact mechanism of contraction is unknown, the wound closure process is accompanied by and followed by changes in the physical and mechanical properties of the wound and periwound tissues during the biological transformation. Transforming growth factor-β (TGF-β) induces a contractile phenotype in the cellular-extracellular matrix. Meanwhile, various external and internal mechanical stresses lead to microdeformations of the wound milieu with resultant upregulation of TGF-β. Furthermore, the mechanical strain exerted on collagen fibres and other piezoelectric tissues leads to development of piezoelectric current in the wound site, which acts synergistically with TGF-β. TGF-β and mechanical strain regulate the orientation of collagen fibres parallel with the skin surface, which minimises the induction of piezoelectricity through the action of internal forces because of improper angulation of collagen fibres and these forces. The resulting dominance of external forces guides the contractile activity towards restoration of the original unwounded tissue architecture and functional activity of the previously wounded milieu. The aforementioned contractile activity proceeds into the remodelling phase of wound healing as the level of TGF-β is reduced and myofibroblasts undergo apoptosis.

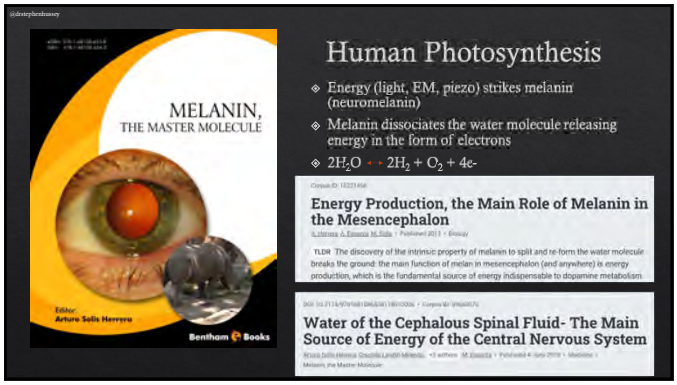
130


Skin accelerometer displacement and relative bone movement of adjacent vertebrae in response to chiropractic percussion thrusts.
Author information
Journal of Manipulative and Physiological Therapeutics
to the spine. Piezoelectric accelerometers attached to bone of an anesthetized dog measured transverse, X-Z plane, movements of L2-L3 adjacent vertebrae while percussion thrusts of an instrument used for manipulation made inputs three vertebrae above and five vertebrae below the L2-L3 joint interface. Small, relative 1 mm translations and 0.5 degree rotations occurred during the first 10 msec. When one set of accelerometers were stabilized on the skin surface, half of the skin-bone translation maxima erred less than 2%. However, skin translations averaged 77% (SD ~ 2%) of bone translations and skin rotations averaged 95% (SD = 26%) of bone rotations. The results suggest the possibility that, with further development, piezoelectric accelerometers can be a noninvasive tool to study dynamic, relative, bone movement.
Medical Hypotheses
Biological significance of piezoelectricity in relation to acupuncture, Hatha Yoga, osteopathic medicine and action of air ions
and Deibert (58). They found, by recording evoked potentials using surface electrodes, that osteopathic therapy changed an electromyographic pattern. Along the same line is the study using the liquid crystal technique, which demonstrated temperature variations in the related paraspinal areas prior to and following osteopathic manipulative therapy (59).
It may be concluded that in osteopathic therapy, as in Hatha Yoga, a mechanical strain is transduced into electric current due to piezoelectric properties of biopolymers to which the strain is applied. Electricity generated in such a way is conducted to other parts of the body to exert effects on distant cells, tissues and organs.

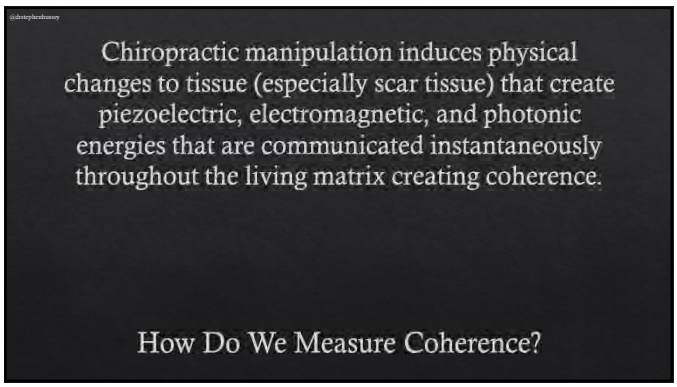
131


Chiropractic Enhances Communication in the Body
The Awareness of the Fascial System
Bruno Bordoni • Marta Simonelli
Published: October 01, 2018 DOI: 10.7759/cureus.3397
Emission of Biophotons and Adjustable Sounds by the Fascial System: Review and Reflections for Manual Therapy
Bruno Bordoni, PhD DO, Fabiola Marelli, PhD DO, Bruno Morabito, PhD DO, and Beatrice Sacconi, MD
Manual Treatment and Biophotons
Manual therapy, such as osteopathic and chiropractic treatment, has proven to create variations in photon emissions. Studies have highlighted how approaches with direct articular techniques (high-velocity low-amplitude), or cranial-sacral techniques, influence the emission of photons both locally and in distant areas from the manual application area, with a reduction and an increase, respectively. The UPE response is probably related to the fascial tissue, as well as its regional propagation and throughout the body, as a response to the techniques.
awareness [5]. Electromagnetism is associated with another law of quantum physics, the "non-local entanglement": when two cells or molecules are in contact, this connection creates an unbroken microbiological link; in this way, every cell is aware of what happens to another cell, no matter how far away [5]. During a morphological change, the energy released by MAPs and by other cellular structures is minimal or quantum. It is possible to summarize this quantum energy by the formula: E = hv ("E" represents a particle's energy, "v" is the oscillation, "h" is the
Coherence

132


MELANIN,
THE MASTER MOLECULE
Editor:
Arturo Solis Herrera
Bentham Books
Human Photosynthesis
Energy (light, EM, piezo) strikes melanin (neuromelanin)
Melanin dissociates the water molecule releasing energy in the form of electrons
$2H_2O \leftrightarrow 2H_2 + O_2 + 4e^-$
Energy Production, the Main Role of Melanin in the Mesencephalon
TLDR The discovery of the intrinsic property of melanin to split and re-form the water molecule breaks the ground: the main function of melan in mesencephalon (and anywhere) is energy production, which is the fundamental source of energy indispensable to dopamine metabolism
Water of the Cephalous Spinal Fluid- The Main Source of Energy of the Central Nervous System

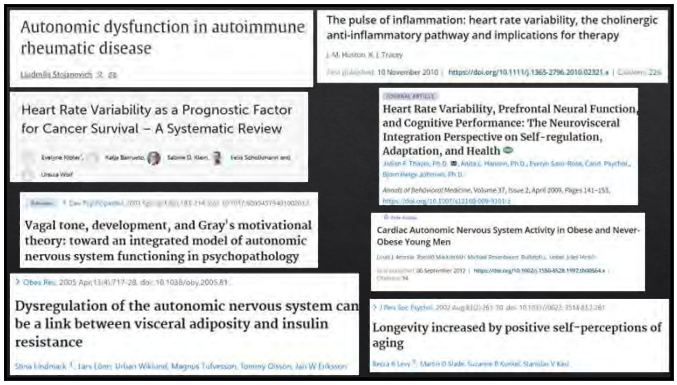
133


Chiropractic manipulation induces physical changes to tissue (especially scar tissue) that create piezoelectric, electromagnetic, and photonic energies that are communicated instantaneously throughout the living matrix creating coherence.
How Do We Measure Coherence?

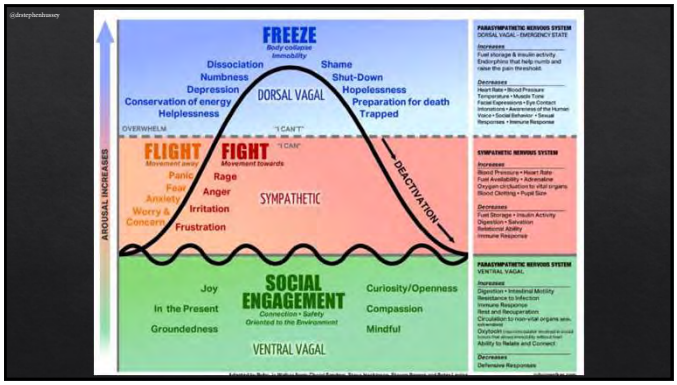
134


Suboccipital Decompression Enhances Heart Rate Variability Indices of Cardiac Control in Healthy Subjects
The Effects of Thoracic Manipulation on Heart Rate Variability: A Controlled Crossover Trial
Effect of Chiropractic Care on Heart Rate Variability and Pain in a Multisite Clinical Study
Heart Rate Variability to Assess the Changes in Autonomic Nervous System Function Associated With Vertebral Subluxation
Christopher Kent*
Review Article
Innocuous mechanical stimulation of the neck and alterations in heart-rate variability in healthy young adults
The Impact of Cervical Manipulation on Heart Rate Variability
Publisher: IEEE
Heart Rate Variability Modulation After Manipulation in Pain-Free Patients vs Patients in Pain
Sympathetic and parasympathetic responses to specific diversified adjustments to chiropractic vertebral subluxations of the cervical and thoracic spine

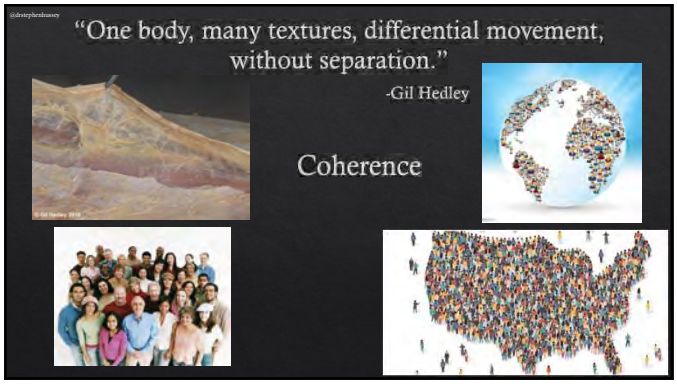
135


Autonomic dysfunction in autoimmune rheumatic disease
The pulse of inflammation: heart rate variability, the cholinergic anti-inflammatory pathway and implications for therapy
Heart Rate Variability as a Prognostic Factor for Cancer Survival – A Systematic Review
Heart Rate Variability, Prefrontal Neural Function, and Cognitive Performance: The Neurovisceral Integration Perspective on Self-regulation, Adaptation, and Health
Vagal tone, development, and Gray's motivational theory: toward an integrated model of autonomic nervous system functioning in psychopathology
Cardiac Autonomic Nervous System Activity in Obese and Never-Obese Young Men
Dysregulation of the autonomic nervous system can be a link between visceral adiposity and insulin resistance
Longevity increased by positive self-perceptions of aging

136


FREEZE
Body collapse
Immobility
Dissociation
Numbness
Depression
Conservation of energy
Helplessness
Shame
Shut-Down
Hopelessness
Preparation for death
Trapped
DORSAL VAGAL
"I CAN'T"
OVERWHELM
FLIGHT
Movement away
Panic
Fear
Anxiety
Worry & Concern
FIGHT
Movement towards
Rage
Anger
Irritation
Frustration
"I CAN"
SYMPATHETIC
DEACTIVATION
AROUSAL INCREASES
SOCIAL ENGAGEMENT
Connection • Safety
Oriented to the Environment
Joy
In the Present
Groundedness
Curiosity/Openness
Compassion
Mindful
VENTRAL VAGAL

137


"One body, many textures, differential movement, without separation."
-Gil Hedley
Coherence

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REVIEW ARTICLE

Coherence: bridging personal, social and global health

Rollin McCraty

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Introduction

Of the many new scientific perspectives that emerged from the twentieth century, one of the most profound is that the universe is wholly and enduringly interconnected and *coherent* (Bohm & Hiley 1993; Laszlo 1995; 2008). Complex living systems, including human beings, are composed of numerous dynamic, interconnected networks of biological structures and processes. Coherence implies order, structure, harmony and alignment within and amongst systems – whether in atoms, organisms, social groups, planets or galaxies. Thus every whole has a relationship with and is a part of a greater whole, which is again part of something greater. In this context, nothing can be considered as separate, alone or lacking relationships. One of the more surprising findings that has emerged from physics is quantum coherence, which has given rise to the prediction of non-locality and instantaneous communication between subatomic particles separated by vast distances (Bohm & Hiley 1993).

Most people know what it feels like to be in harmonious state, the place where our hearts, minds and bodies are united in a feeling of wholeness. This state is often referred to as "the zone," "flow," "oneness," etc. When we are in such states we typically feel connected not only to our deepest selves but to others, even to the earth itself. We call this state of internal and external connectedness "coherence." This overview discusses how increased personal coherence can be achieved as people learn to more consistently self-regulate their emotions from a more intuitive, intelligent and balanced, inner reference and how this state is directly associated with increased intuition, improved health and cognitive functioning. It also describes how coherence is reflected in physiology and objectively measured. The discussion then expands to coherence in the context of families, workplaces, and communities. The article concludes with the perspective that being responsible for and increasing our personal coherence is not only reflected in improved personal health and happiness, but is also feeds into and is reflected in a global field environment. It is postulated that as increasing numbers of people add coherent energy to the global field, it helps strengthen and stabilize mutually beneficial feedback loops between human beings and the earth itself.

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Infrared Light, EMF, and Scar Tissue

Long-term histological comparison between near-infrared irradiated skin and scar tissues

V-EMF treatment of facial scar: First results

Conclusion

A scar is a permanent aesthetic, functional and psychological damage. Identifying a method that solves all these aspects is undoubtedly a challenge for regenerative medicine.

The method described in this study, applied to what are considered the most difficult scars to treat, i.e. facial scars, has shown extremely interesting and promising results, from an aesthetic and functional point of view, with the restoration of hydration levels, and for the overall anti-aging effect of the treated area....

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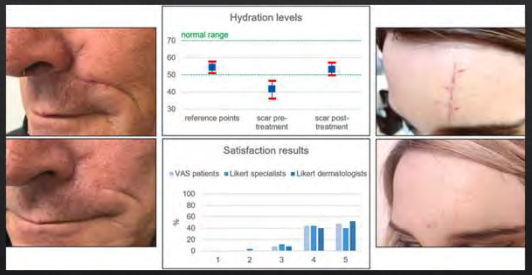

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Clinical Approach

- Affecting Fascia
  - Spinal Manipulation
  - Soft Tissue Manipulation
  - Movement (esp. to the point of creating body heat)
  - Resolve unresolved/stored past trauma
- Hydrating Fascia
  - Toxin free, mineral rich, energized water
  - Sunlight
  - Grounding
  - Light modalities (LLLT, infrared sauna, red light panel, etc)
  - Avoid toxins (glyphosate, plastics, heavy metals)
  - Minimize nnEMF exposure
  - Eat good fats (ghee, butter, lard, tallow, seafood)
  - Cold exposure
  - Express love and gratitude

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Summary

- Coherence is the ability of the body to effectively communicate and have every cell in the system on the same page.
- The heart is the only organ that can "touch" every cell in the body, coherence of the entire body can be measured via Heart Rate Variability.
- Proper body coherence is dependent on an intact collagen network, hydrated by 4th phase water, so that electrons, protons, photons, and phonons can be conducted/communicated throughout the body.
- Scar tissue (dehydrated collagen) interferes with the ability of the body to communicate and achieve coherence.
- Chiropractic creates a piezoelectric effect that can restore normal collagen, light will help with hydration too.
- Chiropractic creates coherence. This is most evident when we see the effects of Chiropractic on HRV, our best measure of coherence.

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As Chiropractors…

- Can we educate on Heart Rate Variability?
- Can we use light as a therapeutic to build 4th phase water on collagen?
- Can we tell people to ground their bodies?
- Can we create a piezoelectric effect with spinal manipulation?
- Can we help change the world?

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Topics

- ~~Cholesterol does not cause atherosclerosis, clotting does~~
- ~~The heart is not the main mover of blood in the body~~
- Quantum Chiropractic. HRV, Fascia, Coherence, and Chiropractic
- Not all heart attacks happen because of a blockage

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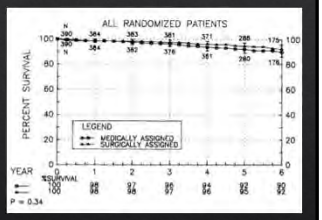
Blockages – The Evidence Against

- The Coronary Artery Surgery Study (CASS), performed in clinics in the USA and Canada.
  - 800 patients with CAD – received surgery + meds or meds alone.
  - At 5, and 10-year checkpoints - no difference in outcomes between the groups.
  - After 5 years, the percent of people still alive and not having had a HA was nearly the same in the groups (82% and 83%)
  - Authors concluded that bypass surgery neither prolonged life nor prevent further MI's.



-CASS Principle Investigators. Myocardial Infarction and Mortality in the Coronary Artery Surgery Study (CASS) Randomized Trial. N Engl J Med (1984), 310:750-758
-Alderman EL, et al.. Ten-Year Follow-up of Survival and Myocardial Infarction in the Randomized Coronary Artery Surgery Study. Circulation (1990), 82:1629-1646

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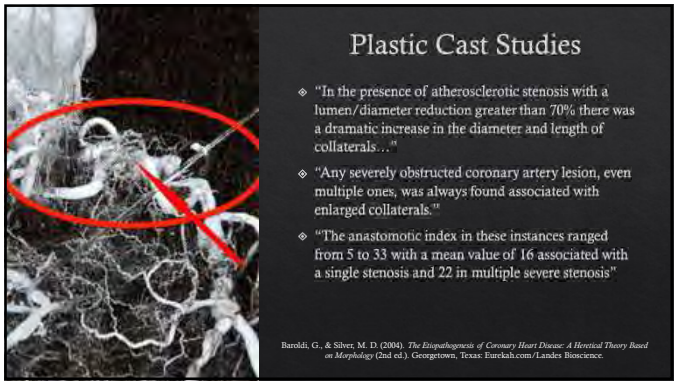
Plastic Cast Studies
"In the presence of atherosclerotic stenosis with a lumen/diameter reduction greater than 70% there was a dramatic increase in the diameter and length of collaterals…"
"Any severely obstructed coronary artery lesion, even multiple ones, was always found associated with enlarged collaterals."
"The anastomotic index in these instances ranged from 5 to 33 with a mean value of 16 associated with a single stenosis and 22 in multiple severe stenosis"
Baroldi, G., & Silver, M. D. (2004). The Etiopathogenesis of Coronary Heart Disease: A Heretical Theory Based on Morphology (2nd ed.). Georgetown, Texas: Eurekah.com/Landes Bioscience.

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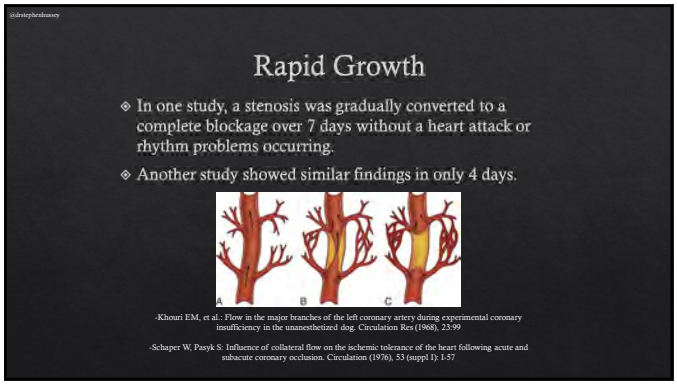
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Rapid Growth
In one study, a stenosis was gradually converted to a complete blockage over 7 days without a heart attack or rhythm problems occurring.
Another study showed similar findings in only 4 days.
A
B
C
-Khouri EM., et al.: Flow in the major branches of the left coronary artery during experimental coronary insufficiency in the unanesthetized dog. Circulation Res (1968). 23:99
-Schaper W, Pasyk S: Influence of collateral flow on the ischemic tolerance of the heart following acute and subacute coronary occlusion. Circulation (1976). 53 (suppl I): I-57

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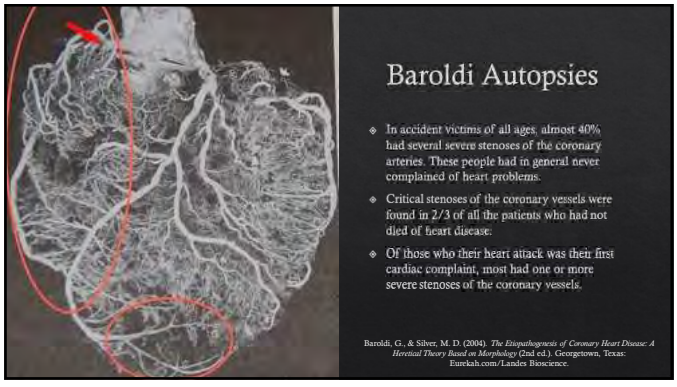
Baroldi Autopsies
In accident victims of all ages, almost 40% had several severe stenoses of the coronary arteries. These people had in general never complained of heart problems.
Critical stenoses of the coronary vessels were found in 2/3 of all the patients who had not died of heart disease.
Of those who their heart attack was their first cardiac complaint, most had one or more severe stenoses of the coronary vessels.
Baroldi, G., & Silver, M. D. (2004). The Etiopathogenesis of Coronary Heart Disease: A Heretical Theory Based on Morphology (2nd ed.). Georgetown, Texas: Eurekah.com/Landes Bioscience.

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Myocardial Infarction with non-obstructed coronary arteries (MINOCA)

- In 5% to 20% of cases, an angiogram will show "non-obstructive coronary artery disease," which means that the arteries are less than halfway blocked.
- More common in women than men and affects up to 187,000 people in the United States each year.

MINOCA Study | Women's Heart Attack Research Program. (n.d.). Retrieved from https://med.nyu.edu/research/womens-heart-attack-research-program/minoca-study

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ST segment Elevation MI (Stemi) vs. Non-ST segment MI (Nstemi)

- "ACSs are simply a mismatch in the myocardial oxygen demand and myocardial oxygen consumption. While the cause of this mismatch in STEMI is nearly always coronary plaque rupture resulting thrombosis formation occluding a coronary artery, there are several potential causes of this mismatch in NSTEMI."
- "Among the 60,898 patients with NSTEMI enrolled in 25 studies, 17,212 were found to have OCA. The average proportion of OCA in NSTEMI was 34% (95% CI 30–37%)."

-Hung, C., Chen, Y., Huang, C., Lin, M., Yeh, C., Li, H., & Kao, H. (2018). Prevalence and outcome of patients with non-ST segment elevation myocardial infarction with occluded "culprit" artery – a systemic review and meta-analysis. *Critical Care, 22*(1). doi:10.1186/s13054-018-1944-x

-Basit, H., Malik, A., & Huecker, M. R. (2019). Non-ST-Segment Elevation Myocardial Infarction (NSTEMI). *StatPearls*. doi:10.1007/springerreference_225168

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What causes those heart attacks without a blockage?

THE THREE IMBALANCES

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Polyvagal Theory

- Before reptiles the vagus nerve communicated solely through the visceral efferents in the dorsal motor nucleus
- Most reptiles still have this single track, but in turtles there is evidence that this has started to split and the vagus has started to communicate through DMN and a ventrolateral nucleus called the nucleus ambiguus
- In lizards and crocodiles the separation between the two nuclei is complete causing two separate signaling pathways for the vagus nerve

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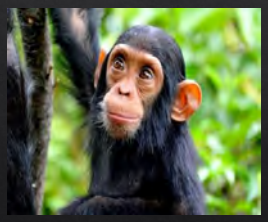
Polyvagal Theory



- The separate nuclei vagus system is the one that was passed on to all mammals
- DMN – Responsible for stimulating sympathetic nervous system
- NA – Vagal break that evolved to keep our complex brains and emotions from over stimulating the DMN (parasympathetic)
- NA supplies visceral efferent to the heart

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Dr. Robert Sapolsky

- For recently evolved primates a stressor is more than a physical challenge to homeostasis, it also includes thinking you're *going to be* thrown out of homeostasis.
- If you're constantly but incorrectly being convinced you're about to be thrown out of balance, you're being an anxious, neurotic, paranoid, or hostile primate who is psychologically stressed.

Sapolsky, R. M. (2018). *Behave: The biology of humans at our best and worst.* London: Vintage.

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- Mobilizing energy while sprinting for your life helps save you. Do the same thing chronically because of a stressful thirty-year mortgage, and you're at risk for metabolic problems like diabetes and high blood pressure.

Sapolsky, R. M. (2018). *Behave: The biology of humans at our best and worst.* London: Vintage.

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How can we measure ANS balance?

HEART RATE VARIABILITY

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- Dr. Knut Sroka
  - Analyzed 12 different studies
  - Summarized in "On the Genesis of Myocardial Ischemia"
  - Conclusion: about ¾ of MI's are triggered when there is an imbalance between the sympathetic and parasympathetic nervous systems.
- "Hypertension, congestive heart failure, cardiac arrhythmias, myocardial infarction and ischemic stroke can be the result of an ANS imbalance."

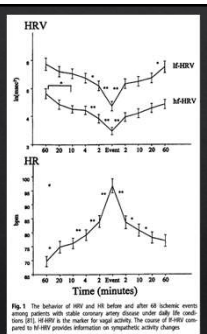

Fig. 1 The behavior of HRV and HR before and after 48 ischemic events among patients with stable coronary artery disease under daily life conditions [81]. HI-HRV is the marker for vagal activity. The course of M-HRV compared to M-HRV provides information on sympathetic activity changes.

-Kop WJ, et al: Changes in heart rate and heart rate variability before ambulatory ischemic events. J Am Coll Cardiol (2001), 38:742-749

-Grassi G, Arenare F, Pieruzzi F, Brambilla G, Mancia G. Sympathetic activation in cardiovascular and renal disease. J N Ephrol. 2009; 22: 190-195.

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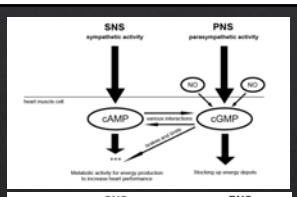

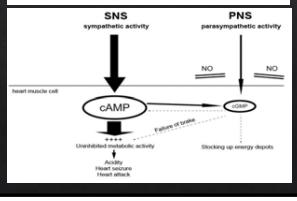

"In a specific tissue, the sympathetic and parasympathetic nervous systems essentially work in opposition. Activation of one leads to the lesser activation of the other. "

Sroka, K. (2013). What is the connection between oxidative stress and heart attacks? Retrieved from heartattacknew.com/faq/what-is-the-connection-between-oxidative-stress-and-heart-attacks/

Porges S. The polyvagaltheory: new insights into adaptive reactions of the autonomic nervous system. Cleveland Clinical Journal of Medicine. April 2009; 2:S86-S90.

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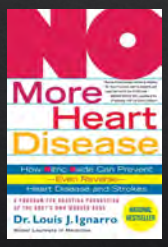
L-Arginine

- In 1998, Robert F. Furchgott, Louis J. Ignarro and Ferid Murad won the Nobel prize for discovering that NO was a signaling molecule in the cardiovascular system.
- L-arginine has been shown to increase NO production and mitochondrial membrane potential while decreasing reactive oxygen species and LDH release.



Venardos, K. M., Rajapakse, N. W., Williams, D., Hoe, L. S., Peart, J. N., & Kaye, D. M. (2015). Cardio-protective effects of combined l-arginine and insulin: Mechanism and therapeutic actions in myocardial ischemia-reperfusion injury. *European Journal of Pharmacology, 769*, 64-70. doi:10.1016/j.ejphar.2015.10.046

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Adrenaline Rush

- Surge in sympathetic without NO present prevents parasympathetic balance.
- Studies have shown that applying adrenaline, main substance in SNS activity, to well-supplied and healthy hearts results in the heart cells becoming very acidic (lactic acidosis).
- This happens because the adrenaline forces the heart cells to burn glucose rather than ketones, their preferred fuel source.

-Fishbein MC, et al.: How big are coronary atherosclerotic plaques that rupture? Circulation (1996), 94:2662-2666
-Airaksinen K, et al.: Impaired vagal heart control in coronary artery disease. Br Heart J (1987), 58:592-597
-Kop WJ, et al: Changes in heart rate and heart rate variability before ambulatory ischemic events. J Am Coll Cardiol (2001), 38:742-749
-Andrews, M. T., Russeth, K. P., Drewes, L. R., & Henry, P. (2009). Adaptive mechanisms regulate preferred utilization of ketones in the heart and brain of a hibernating mammal during arousal from torpor. *American Journal of Physiology-Regulatory, Integrative and Comparative Physiology, 296*(2), R383-R393. doi:10.1152/ajpregu.90795.2008

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Heart Attack

- Just like in skeletal muscle this acid build-up produces a weakened and painful muscle. This acidity is most problematic in the left ventricle, it does most of the work and is under the most tension than the other chambers.
- The acidosis prevents calcium from being able to enter the cells preventing them from being able to contract. It has been shown that low calcium in cardiac cells results in slower conduction velocity and elevated arrhythmia risk.
- This causes localized edema, dysfunctional cell walls, and eventually necrosis.

-George, S. A., & Poelzing, S. (2016). Cardiac conduction in isolated hearts of genetically modified mice – Connexin43 and salts. *Progress in Biophysics and Molecular Biology, 120*(1-3), 189-198. doi:10.1016/j.pbiomolbio.2015.11.004
-Schmid, P. G., Greif, B. J., Lund, D. D., & Roskoski, R. (1978). Regional choline acetyltransferase activity in the guinea pig heart. *Circulation Research, 42*(5), 657-660. doi:10.1161/01.res.42.5.657

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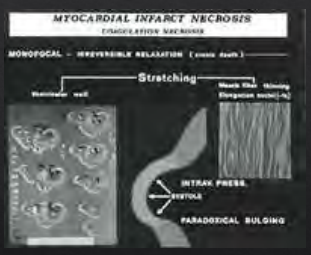
"Paradoxical Bulging"



Baroldi, G., & Silver, M. D. (2004). *The Etiopathogenesis of Coronary Heart Disease: A Heretical Theory Based on Morphology* (2nd ed.). Georgetown, Texas: Eurekah.com/Landes Bioscience.

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Different morphological types of myocardial cell death in man.

Baroldi G

Recent Advances in Studies on Cardiac Structure and Metabolism, 31 Dec 1974, 6:383-397

PMID: 1105714

INTERACTIONS O … CONTRACTILITY
GLYCOGEN AND F … AMMALIAN
HEARTS

JACOB A. BLUKOO-ALLOTEY, NORMA H. VIN…

ELSEVIER

Cardiac … genetica… … salts … ion represent

Sharon A. George

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Can chiropractic help with these imbalances?

- Heart Metabolism
- ANS Balance
- Oxidative Stress

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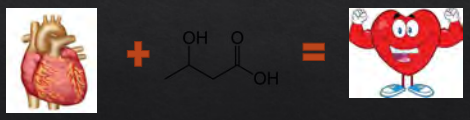
Ketones

- Fatty acid oxidation, or fat burning, makes about 70% of the ATP that your heart produces.
- Add burning ketones to the mix and it can improve heart efficiency by 28%.



-Dedkova, E. N., & Blatter, L. A. (2014). Role of β-hydroxybutyrate, its polymer poly-β-hydroxybutyrate and inorganic polyphosphate in mammalian health and disease. *Frontiers in Physiology, 5*. doi:10.3389/fphys.2014.00260
-Kashiwaya, Y., Sato, K., Tsuchiya, S., Thomas, S., & Fell, D. A. (1994). Control of glucose utilization in the perfused rat heart. *Journal of Biological Chemistry, 269*, 25502-25514.

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Regulation of Substrate Oxidation in Isolated Myocardial Cells by β-Hydroxybutyrate

V. Chen, G. Wagner and J.J. Spitzer
Department of Physiology, Louisiana State University Medical Center, New Orleans, Louisiana, U.S.A.

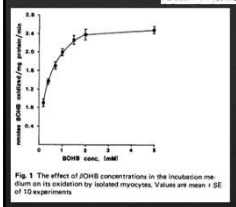

Fig. 1 The effect of βOHB concentrations in the incubation medium on its oxidation by isolated myocytes. Values are mean ± SE of 10 experiments

Table 1 The effect of βOHB on lactate, octanoate or palmitate oxidation by isolated myocytes

βOHB concentration (mM)	0	0.4	1	2	5
Lactate (7.5 mM) oxidation; N=10	6.01 ± 0.30	----	4.14 ± 0.31(−30%)[c]	2.96 ± 0.31(−50%)[c]	2.38 ± 0.34(−60%)[c]
Octanoate (2 mM) oxidation; N=8	1.61 ± 0.05	----	1.50 ± 0.05(−7%)	1.44 ± 0.06(−10%)	1.34 ± 0.05(−17%)[b]
Palmitate (0.4 mM) oxidation; N=5	0.92 ± 0.09	0.73 ± 0.08(−21%)[a]	0.60 ± 0.07(−35%)[c]	----	0.60 ± 0.09(−35%)[b]
Palmitate (1 mM) oxidation; N=5	1.19 ± 0.09	0.82 ± 0.09(−31%)[b]	0.75 ± 0.07(−37%)[b]	----	0.73 ± 0.09(−39%)[b]

Values are means ± SE nmoles/mg protein/min
[a,b,c]$p < 0.05$, $P < 0.01$ and $P < 0.001$ vs 0 mM βOHB

It may be concluded from these studies that among the physiologic substrates tested, βOHB is the preferred substrate for myocardial metabolism. βOHB may also serve as a regulator of other substrates influencing not only the supply of substrates that are available for the myocardium, but also their rate of oxidation. Ketone bodies suppress the utilization of carbohydrate substrates more readily than of fatty acids.

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Research Article

Glucose Metabolic Changes in the Brain and Muscles of Patients with Nonspecific Neck Pain Treated by Spinal Manipulation Therapy: A [^{18}F]FDG PET Study

Akie Inami,[1] Takeshi Ogura,[1,2] Shoichi Watanuki,[1] Md. Mehedi Masud,[1,3] Katsuhiko Shibuya,[4] Masayasu Miyake,[1] Rin Matsuda,[1] Kotaro Hiraoka,[1] Masatoshi Itoh,[4] Arlan W. Fuhr,[5] Kazuhiko Yanai,[1,2] and Manabu Tashiro[1]

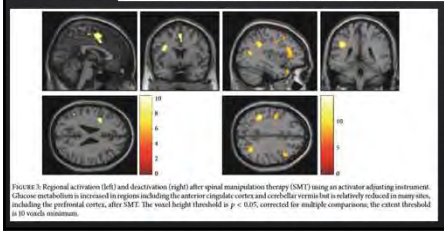

FIGURE 3: Regional activation (left) and deactivation (right) after spinal manipulation therapy (SMT) using an activator adjusting instrument. Glucose metabolism is increased in regions including the anterior cingulate cortex and cerebellar vermis but is relatively reduced in many sites, including the prefrontal cortex, after SMT. The voxel height threshold is $p < 0.05$, corrected for multiple comparisons; the extent threshold is 10 voxels minimum.

5. Conclusion

In summary, we observed metabolic changes in the brain and skeletal muscles, as well as reductions in subjective pain, muscle tension, and salivary amylase, after SMT intervention. These results may be associated with reduced sympathetic nerve activity, suggesting that SMT induces a kind of relaxation similar to that achieved by biofeedback. The brain response to SMT may reflect the psychophysiological relaxation that accompanies reduced sympathetic nerve activity.

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Can chiropractic help with these imbalances?

~~Hormone Metabolism~~

ANS Balance

Oxidative Stress

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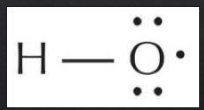
Oxidative Stress

- Properties of Free Radicals
  - Highly reactive
  - Very short half-life
  - Generate new radicals by chain reaction
  - Cause damage to cells and tissues
- What Causes Free Radicals?
  - Breakdown of ΣZ
  - Metabolic inflexibility
  - High toxic load
  - Elevated blood glucose (AGE)
  - Endotoxemia



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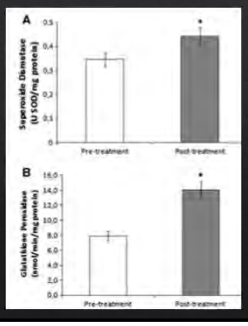
HVLA 2x weekly for 5 weeks

Peripheral Oxidative Stress Blood Markers in Patients With Chronic Back or Neck Pain Treated With High-Velocity, Low-Amplitude Manipulation

Carolina Kolberg, BSc (Chiro), PhD,* Andréa Horst, BBiomedSc, MSc,* Maira S. Moraes,† Felipe Coutinho Kullmann Duarte, BSc (Chiro), MSc,* Ana Paula Konzen Riffel, BBioSc, MSc,* Talita Scheid, BPharm, PhD,* Angela Kolberg, PT, PhD,‡ and Wania A. Partata, BBioSc, PhD*



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Can chiropractic help with these imbalances?

~~H[illegible] Metabolism~~

ANS Balance

~~Oxidative Stress~~

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Effects of Upper and Lower Cervical Spinal Manipulative Therapy on Blood Pressure and Heart Rate Variability in Volunteers and Patients With Neck Pain: A Randomized Controlled, Cross-Over, Preliminary Study

Bi Ni Win HEES, PhD,*† Anna Maria S. Jorgensen PhD,† Yu Sai Chen PhD,† and Michael T. Hamelinx DC, MPH‡

Table 3A Pre- and Post-SMT Measures of Normalized Unit (nu) of Heart Rate Variability and the Ratio of Low Frequency (LF) to High Frequency (HF) in Volunteer's Group (n = 10)

	Pre-SMT	Post-SMT
Upper cervical		
SDNN	83.54 ± 22	105.41 ± 20 [a]
nu LF	44.34 ± 14	36.36 ± 13 [a]
nu HF	40.18 ± 9	46.08 ± 14 [a]
LF/HF	1.04 ± 0.6	0.62 ± 0.5 [a]
Lower cervical		
SDNN	85.89 ± 22	80.86 ± 20 [b]
nu LF	45.12 ± 9	53.81 ± 10 [a, b]
nu HF	45. 85 ± 8	38.37 ± 12 [a, b]
LF/HF	1.05 ± 0.7	1.51 ± 0.5 [a, b]

Values are presented in mean ± SD.
SDNN, standard deviation of average normal to normal R-R intervals; *SMT*, spinal manipulative therapy.
[a] $P < .05$, relative to baseline value.
[b] $P < .05$ between upper and lower cervical SMT patients.

Table 3B Pre- and Post-SMT Measures of Normalized Unit (nu) of Heart Rate Variability and the Ratio of Low Frequency (LF) to High Frequency (HF) in Patient's Group (n = 10)

	Pre-SMT	Post-SMT
Upper cervical		
SDNN	70.48 ± 18 [a]	90.23 ± 20 [b]
nu LF	52.89 ± 7	38.38 ± 6 [b]
nu HF	41.18 ± 7	48.54 ± 8 [b]
LF/HF	1.33 ± 0.3 [a]	0.81 ± 0.2 [b]
Lower cervical		
SDNN	75.19 ± 16 [a]	97.52 ± 22 [b]
nu LF	49.13 ± 14	39.44 ± 13 [b]
nu HF	44. 13 ± 8	53.25 ± 12 [b]
LF/HF	1.22 ± 0.4 [a]	0.86 ± 0.3 [b]

Values are presented in mean ± SD.
SDNN, standard deviation of average normal to normal R-R intervals; *SMT*, spinal manipulative therapy.
[a] $P < .05$ between volunteer and patient groups.
[b] $P < .05$, relative to baseline value.

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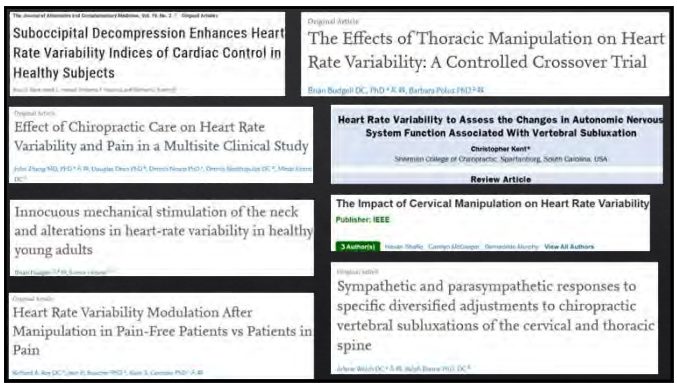
Suboccipital Decompression Enhances Heart Rate Variability Indices of Cardiac Control in Healthy Subjects
The Effects of Thoracic Manipulation on Heart Rate Variability: A Controlled Crossover Trial
Effect of Chiropractic Care on Heart Rate Variability and Pain in a Multisite Clinical Study
Heart Rate Variability to Assess the Changes in Autonomic Nervous System Function Associated With Vertebral Subluxation
Christopher Kent*
Review Article
Innocuous mechanical stimulation of the neck and alterations in heart-rate variability in healthy young adults
The Impact of Cervical Manipulation on Heart Rate Variability
Publisher: IEEE
Heart Rate Variability Modulation After Manipulation in Pain-Free Patients vs Patients in Pain
Sympathetic and parasympathetic responses to specific diversified adjustments to chiropractic vertebral subluxations of the cervical and thoracic spine

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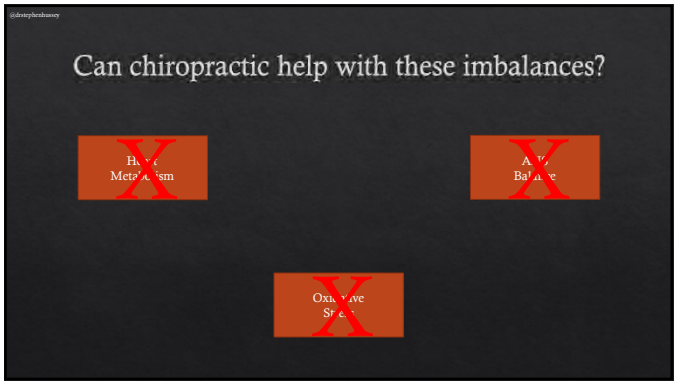
@drstephenhussey
Can chiropractic help with these imbalances?

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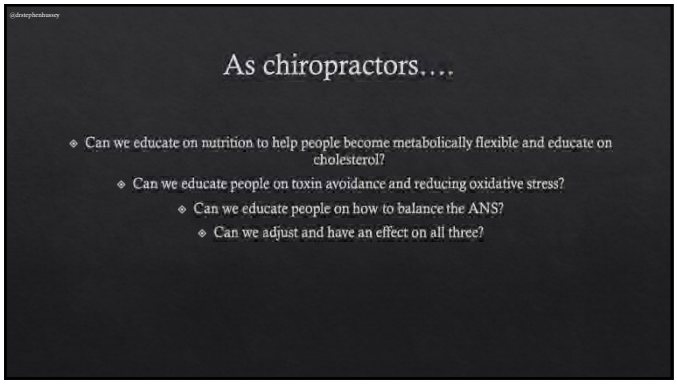
@drstephenhussey
As chiropractors….
Can we educate on nutrition to help people become metabolically flexible and educate on cholesterol?
Can we educate people on toxin avoidance and reducing oxidative stress?
Can we educate people on how to balance the ANS?
Can we adjust and have an effect on all three?

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@drstephenhussey

Topics

- ~~Cholesterol does not cause atherosclerosis, clotting does~~
- The heart is not the main mover of blood in the body
- Quantum Chiropractic. HRV, Fascia, Coherence, and Chiropractic
- Not all heart attacks happen because of a blockage

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