

The background is a light blue gradient with several realistic water droplets of various sizes scattered across it. The droplets have highlights and shadows, giving them a three-dimensional appearance.

LYMPHEDEMA, LIPEDEMA AND NUTRITION

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The background is a light blue gradient. There are several realistic-looking water droplets of various sizes in the corners. In the top-left corner, there are three droplets of different sizes. In the top-right corner, there is one medium-sized droplet. In the bottom-right corner, there is a cluster of several droplets, including a large one and several smaller ones. In the bottom-center area, there are two more droplets of different sizes.

NO FINANCIAL IMPLICATIONS OR DISCLOSURES FOR THIS PRESENTATION

LYMPHEDEMA

Primary lymphedema: occurs as a result of abnormal development of the lymphatic system

Secondary lymphedema: results from damage, disruption or trauma to a previously normal lymphatic system

STAGES OF LYMPHEDEMA



STAGES OF LYMPHEDEMA

- 0 STAGE: SUBCLINICAL IMPAIRED LYMPH DRAINAGE WITH SUBJECTIVE SYMPTOMS OF HEAVINESS THAT CAN EXIST MONTHS BEFORE OVERT EDEMA
- STAGE I: REVERSIBLE ACCUMULATION OF HIGH PROTEIN FLUID WITH PITTING
- STAGE II: IRREVERSIBLE EDEMA WITH PITTING AND IN LATER STAGES SOME FIBROUS OCCURS
- STAGE III: ALSO CALLED ELEPHANTIASIS, PITTING IS ABSENT DUE TO FIBROTIC SKIN CHANGES AND FATTY DEPOSITION WITH PAPILLOMATOSIS

DIAGNOSIS OF LYMPHEDEMA

- CLINICAL: SUBJECTIVE SYMPTOMS OF SWELLING, HEAVINESS AND STIFFNESS PAIRED WITH FINDING OF EDEMA AND STEMMER'S SIGN AND AT LEAST A 2 CM DIFFERENCE IN LIMB CIRCUMFERENCE.
- PROCEDURAL DIAGNOSTICS: A. LYMPHOSCINTIGRAPHY
 - B. MRI LYMPHOGRAPHY (NOT APPROVED IN US)
 - C. NEAR INFRARED FLUORESCENCE IMAGING (NIRF) WITH INDOCYANINE GREEN (ICG) USED IN LVA BUT SELDOM FOR DX

TREATMENT OF LYMPHEDEMA

- CDT : MLD, BANDAGING, EXERCISES, SKIN CARE EDUCATION AND GARMENT FITTING
- IPC: INTERMITTENT PNEUMATIC COMPRESSION
- LIPOSUCTION: CSAL, CIRCUMFERENTIAL SUCTION ASSISTED LIPECTOMY OR SAPL, SUCTION ASSISTED PROTEIN LIPECTOMY
- LVA: LYMPH VENOUS ANASTOMOSIS
- VLNT: VASCULARIZED LYMPH NODE TRANSPLANT

ALTERNATIVE THERAPIES

- LLLT: LOW LEVEL LASER THERAPY (OMAR, SUPPORT CARE CANCER; 2012)
- ESWT: EXTRACORPOREAL SHOCK WAVE THERAPY(CEBICCI ,ARCH PHYS MED REHABIL:2016)
- STELLATE GANGLION BLOCK FOR BCRL (KIM ET AL SUPPORT CARE CANCER: 2015)

THERAPIES LACKING EVIDENCE

- ACUPUNCTURE
- VIBRATION
- ENDERMOLOGIE
- KINESIO TAPE
- SUPPLEMENTS

LIPDEMA

- SYMMETRICAL DISTRIBUTION OF FAT FROM HIPS TO ANKLES, SPARING THE FEET. APPROXIMATELY 80 % OF PTS HAVE BOTH ARM AND LEG INVOLVEMENT.
- RARELY SEEN IN MEN AND ALMOST ALWAYS ASSOCIATED WITH HORMONAL ABNORMALITIES
- OFTEN PAINFUL WITH MINOR PALPATION
- EASY BRUISING

STAGES OF LIPEDEMA

- STAGE 1: NORMAL SKIN SURFACE WITH LARGE AREAS OF FAT
- STAGE 2: LUMPY APPEARANCE OF FAT (CELLULITE)
- STAGE 3: LARGE EXTRUSIONS OF TISSUE CAUSING DEFORMATIONS
- STAGE 4: LIPOLYMPHEDEMA WITH ABNORMAL FAT ON HANDS FEET, TRUNK AND HEAD

TYPES OF LIPEDEMA

- TYPE I: BUTTOCK AND HIPS (SADDLE BAGS)
- TYPE II: BUTTOCK TO KNEES
- TYPE III: BUTTOCK TO ANKLES
- TYPE IV: ARMS AND LEGS AFFECTED
- TYPE V: LIPOLYMPHEDEMA

CAUSES OF LIPEDEMA

- ESTROGEN IN COMBINATION WITH GENETIC FACTORS:
 - INCREASE FAT AT THE HIPS, AND LEGS
 - BLOCKS FAT CELL MOBILIZATION ON THE HIPS AND LEGS BUT NOT ABDOMEN IN RESPONSE TO EXERCISE
 - INCREASES APPETITE AND DISRUPTS ENERGY EXPENDITURE REGULATION THROUGH INTERFERENCE WITH LEPTIN, INSULIN, GHRELIN WHICH ACT AT THE HYPOTHALAMUS
 - ASIAN WOMEN RARELY HAVE LIPEDEMA AND GENERALLY HAVE LOWER ESTROGEN LEVELS
 - LIPEDEMA PAIN APPEARS TO BE ASSOCIATED WITH THE ESTROGEN METABOLITES: ESTRADIOL-3-GLUCURONIDE AND ESTRADIOL-17-GLUCURONIDE THAT ENHANCE CNS RECEPTORS FOR SPECIFIC PAIN PATTERNS

LEPTIN

- LEPTIN: MADE BY FAT
- STIMULATES ENERGY EXPENDITURE AND MODERATES APPETITE
- THUS REGULATES ENERGY HOMEOSTASIS,
- NEUROENDOCRINE FUNCTION AND METABOLISM
- DISRUPTED BY GUT DYSBIOSIS SEEN IN OBESITY
 - [NCBI.NLM.NIH.GOV](https://www.ncbi.nlm.nih.gov)

MORE LEPTIN

- LEPTIN HAS BEEN SHOWN TO ENHANCE THE ACCURACY OF BMI ,
- WHICH UNDERESTIMATES OBESITY
- AND PREDICTIONS OF OBESITY.
 - SHAH ET AL PLOS ONE 7 (4), E 33308, 2012

EVEN MORE LEPTIN

- OBESSE PERSONS ARE RESISTANT TO LEPTIN
- AND NEW EFFORTS ARE BEING PURSUED TO FIND TARGETED LEPTIN SENSITIZING THERAPIES FOR OBESITY.
 - PARK ET AL, J.METABOL.2014

LEPTIN RESISTANCE

- WHAT ARE POTENTIAL CAUSES OF LEPTIN RESISTANCE?
 - INFLAMMATION
 - FREE FATTY ACIDS
 - HAVING ELEVATED LEPTIN LEVELS
 - ALL OF THESE CAUSES ARE ASSOCIATED WITH OBESITY

LEPTIN RESISTANCE SOLUTIONS

- REDUCING SYSTEMIC INFLAMMATION THROUGH DIET
 - AVOID PROCESSED FOOD TO AVOID GUT FLORA COMPROMISE
 - EAT SOLUBLE FIBER TO IMPROVE GUT HEALTH
 - EXERCISE MAY HELP REDUCE LEPTIN RESISTANCE
 - POOR SLEEP IS IMPLICATED IN LEPTIN RESISTANCE, THUS IMPROVED SLEEP MAY IMPROVE LEPTIN RESISTANCE
 - HIGH TRIGLYCERIDES CAN REDUCE LEPTIN TRANSPORT FROM BLOOD TO BRAIN THUS LOWER TRIGLYCERIDES BY DECREASING CARBS
 - EATING HIGH PROTEIN DIET MAY IMPROVE LEPTIN SENSITIVITY

GHRELIN

- GHRELIN FOUND IN THE SMALL INTESTINE AND STOMACH
 - REGULATES APPETITE BY ENHANCING HUNGER
 - REGULATES INSULIN METABOLISM BY CONSERVING CARBOHYDRATE
 - REGULATES FATTY ACID METABOLISM BY PROMOTING OXIDATION

REGULATING ESTROGENS

- LEVELS IN BLOOD ARE CONTROLLED BY GUT BACTERIA , THE LIVER AND DIET
 - GUT DYSBIOSIS INTERFERES WITH ESTROGEN REGULATION
 - CONJUGATED ESTROGENS CAN EITHER BE EXCRETED THROUGH URINE OR FECES OR WITH DYSBIOSIS IE GRAM NEGATIVE GUT BACTERIA OVERGROWTH, REABSORBED AND INCREASE THE ESTROGEN LEVELS (BRAUNDMEIER,ET AL,FRONT PHYSIOL. 2015 APR1)
 - ESTROGEN FROM ANIMAL PRODUCTS; US BEEF CONTAINS INCREASED ESTROGEN FROM IMPLANTS FOR RAPID WEIGHT GAIN (HANDA ET AL, ANNALS ONCOL. 2009, SEP)
 - PHYTOESTROGENS FROM PLANTS 70% OF US WILL CONVERT TO OBESITY PROMOTING METABOLITE O-DESMETHYLANGO-LESIN WHEREAS 60% OF ASIANS WILL CONVERT TO EQUOL AN ANTIOXIDANT (RAFI,METABOLITES, 2015, JAN)

NUTRITIONAL FACTORS THAT INFLUENCE LYMPHEDEMA

- CONDITIONS THAT INCREASE CHYLE CAN INCREASE LYMPH FROM 2-10 TIMES CAUSING OVERLOAD OF THE SYSTEM.
 - CHYLE IS INCREASED BY:
 - HIGH DIETARY FAT INTAKE, LC FATTY ACIDS
 - LIVER DISEASE SUCH AS NASH/ NAFLD ASSOCIATED WITH OBESITY AND HIGH TRIGLYCERIDES
 - (MC CRAY ET AL, PRACTICAL GASTROENTEROLOGY 2011)

NUTRITIONAL MANAGEMENT OF DISRUPTED LYMPHATIC VASCULATURE IN GUT

- ARGININE HELPS REPAIR LYMPHATIC VASCULAR INTEGRITY BY MAKING NITRIC OXIDE AVAILABLE (MORRIS, J.NUTRITION, 2007)
- THUS EATING FOODS HIGH IN ARGININE SUCH AS FISH, BEANS, LENTILS, AND NUTS CAN BE HELPFUL
- EATING FOODS HIGH IN NITRATE/NITRITE SUCH AS GREEN LEAFY VEGETABLES AND FRUITS, INCREASES NITRIC OXIDE ((KOBAYASHI ET AL, NUTRIENTS, 2015 JUN)
- EXERCISE INCREASES NITRIC OXIDE

THE ROLE OF GUT FLORA IN OBESITY

- STRIKING STUDY IN WHICH THE GUT FLORA OF OBESE MOUSE TRANSPLANTED TO LEAN MOUSE RESULTING IN OBESITY AND LEAN MOUSE FLORA TRANSPLANT RESULTED IN OBESE MOUSE WEIGHT LOSS. (CANI ET AL GUT MICROBES. 2012 JUL-AUG)

GUT DYSBIOSIS

- LYMPHEDEMA AND LIPEDEMA ARE ASSOCIATED WITH OBESITY AND THE PRESENCE OF OBESOGENIC GUT FLORA:
 - INCREASED ACID LOVING GRAM NEGATIVE BACTERIA I.E. E. COLI WHICH CAUSE INCREASED GUT PERMEABILITY AND SYSTEMIC INFLAMMATION
 - REDUCED NUMBER ANTI-INFLAMMATORY BACTERIA SUCH AS LACTOBACILLUS

HOW GUT DYSBIOSIS PROMOTES WEIGHT GAIN

- SLOWS GUT MOTILITY THUS HARVESTING MORE CALORIES IN TRANSIT
- INCREASES GUT ACIDITY BY PROLONGED EXPOSURE TO BILE THUS INCREASING GRAM NEGATIVE BACTERIA
- PROMOTES FAT STORAGE AND OVERGROWTH
- ALSO PROMOTES FATTY LIVER DISEASE
- PROMOTES ARGINASE AND THUS LEAKY LYMPHATICS
- DYSREGULATES ESTROGEN LEVELS (BRAUNDMEIER ET AL FRONT PHYSIOL. 2015, APR)

GUT DYSBIOSIS AND ENDOTOXINS

- ENDOTOXINS ARE THE LIPOPOLYSACCHARIDE MEMBRANE OF GRAM-NEGATIVE BACTERIA AFTER THE DIE
- ENDOTOXINS RESULT IN SYSTEMIC INFLAMMATION WHEN THEY ENTER THE CIRCULATION AND ACTIVATE THE IMMUNE SYSTEM AS SEEN IN LYMPHEDEMA AND LIPEDEMA
- TWO ENTRY POINTS FOR ENDOTOXINS;
 - VIA CHYLE AND LACTEALS
 - VIA LEAKY GUT AS SEEN WITH GLUTEN SENSITIVITY WHICH TRIGGERS ZONULIN RELEASE AND GUT PERMEABILITY

DIETS

- WHICH DIETS ARE BEST FOR LYMPHEDEMA AND /OR LIPEDEMA?
 - LOW FAT HIGH FIBER LOW CALORIE
 - HIGH PROTEIN/LOW CARB
 - MEDITERRANEAN
 - AND SOME WORDS ON HCG

LOW FAT, HIGH FIBER, LOW CALORIE DIETS

- THE 1980S EMPHASIS ON LOW FAT DIETS IS BLAMED IN PART ON THE OBESITY EPIDEMIC IN THE US
- LOW FAT, HIGHLY PROCESSED HIGH CARB FOODS REPLACED TRADITIONAL FOODS IN THE DIET
- A RECENT STUDY LOOKING AT LOW CARB AND LOW FAT DIETS SHOWED SIMILAR WEIGHT LOSS AFTER 2 YEARS HOWEVER THE LOW FAT DIET LIMITED FLOUR AND SUGAR

LOW CARB DIETS

- 23 STUDIES DEMONSTRATING SUPERIOR WEIGHT LOSS WITH LOW CARB DIETS
- TWO OF THE CURRENT MOST POPULAR :
 - THE KETO DIET
 - THE PALEO DIET

THE KETO DIET

- DESIGNED TO REDUCE CARBOHYDRATES TO NO MORE THAN 20-30 GRAMS DAILY TO ALLOW FOR THE BODY TO GO INTO KETOSIS AND BURN FAT INSTEAD OF GLUCOSE FOR ENERGY.
- EMPHASIS ON HIGH PROTEIN 25-35% OF CALORIES AND HIGH FAT
- TENDS TO BE LOW FIBER SINCE FRUITS AND VEGETABLES LIMITED AND THUS DIETERS OFTEN CONSTIPATED
- WITHOUT SUPPLEMENTS CAN BE NUTRIENT DEFICIENT DUE TO LACK OF FRUITS, GRAINS, NUTS AND VEGETABLES
- ASSOCIATED WITH HIGHER MORTALITY FOR ALL CAUSES

REVERSING GUT DYSBIOSIS WITH DIET

- FERMENTED FOODS, I.E. KEFIR
- VEGETABLES AND FRUITS
- CITRUS (ANTI-INFLAMMATORY FLAVONOIDS)
- DIETARY FIBER, I.E. INULIN
- OMEGA-3 IN FATTY FISH
- ANTI INFLAMMATORY SPICES

THE PALEO DIET

- INTENDED TO MIMIC THE EATING HABITS OF THE PALEOLITHIC HUMANS
- PRIMARILY HIGH PROTEIN, FRESH FRUITS, VEGETABLES AND LIMITED GRAIN AND DAIRY, NO PROCESSED FOODS
- HEALTHIER AND BETTER ADHERED TO LONG TERM BUT NOT NECESSARILY A WEIGHT LOSS DIET
- ALTHOUGH STUDIES HAVE SHOWN WEIGHT LOSS BY PARTICIPANTS SIMPLY ADHERING TO PRINCIPLES
- CAN BE DEFICIENT IN VITAMIN D AND CALCIUM

THE MEDITERRANEAN DIET

- A DIET INSPIRED BY THE EATING HABITS OF THOSE IN GREECE, SPAIN AND ITALY IN THE 1940S AND 1950S POPULAR IN THE 1990S AND SHOWING A RESURGENCE
- PRIMARILY HIGH LEVELS OF OLIVE OIL, LEGUMES, UNREFINED CEREALS, FRUITS AND VEGETABLES, HIGH CONSUMPTION OF FISH AND LITTLE DAIRY EXCEPT CHEESE AND YOGURT, MODERATE RED WINE AND LITTLE NON FISH MEAT
- META-ANALYSIS BY SEVERAL STUDIES HAVE SHOWN REDUCTION OF CANCER DEATH BY 6%, REDUCED DIABETES II, AND POSSIBLE REDUCED CVD
- THERE MAY BE INCREASED GLUTEN INTOLERANCE ON DIET DUE TO PRESENCE OF PASTA

THE VEGAN DIET

- UNLIKE VEGETARIANS WHO LIMIT THEIR DIET TO ABSTAINING FROM MEAT, FISH AND POULTRY, VEGANS LIMIT ALL ANIMAL PRODUCTS FROM THEIR DIET
- DUE TO RESTRICTIVE NATURE THERE ARE MANY NUTRIENTS THAT CAN BE DEFICIENT:
 - CALCIUM AND VITAMIN D
 - VITAMIN B12
 - PROTEIN
 - OMEGA 3 FATTY ACIDS
 - IRON AND ZINC

HCG DIET

- EFFECTIVE ONLY WITH INJECTABLE HCG DAILY
- FDA HAS BANNED INTERNET SALE OF ORAL HCG
- MUST BE PRESCRIBED BY MD.
- PULSED 20-40 DAYS ON AND 6 WEEKS OFF
- VERY LOW CALORIE DIET OF 550 CALORIES
- AVERAGE 1 POUND WEIGHT LOSS DAILY
- MUST TAKE SUPPLEMENTS TO MAINTAIN ADEQUATE NUTRITION

ADIPONECTIN

- SECRETED BY FAT CELLS
- INCREASES INSULIN SENSITIVITY
- FAT OXIDATIONANAN
- ENERGY EXPENDITURE
- OBESITY REDUCES ADIPONECTINSECRETION

FAT GROWTH IN LIPEDEMA

- INFLUENCE BY INSULIN
 - WHEN INSULIN AND GLUCOSE LEVELS ARE HIGH,
 - LIPEDEMA FAT WILL CONVERT SUGAR TO FAT CELLS SIMILAR TO TYPE II DIABETES AND OTHER STATES OF INSULIN RESISTANCE

LIPEDEMA FAT

- BLOOD AND LYMPHATIC VESSELS HAVE MICROANEURYSMS RESULTING IN LEAKINESS
 - VEG-F GENETIC ANOMALIES MAY RESULT IN ABNORMAL AND IMMATURE VESSELS
 - SZEL, ET AL MED HYPOTHESES, 2014, NOV
- THE FAT CELLS DIFFER FROM NORMAL FAT :
 - LARGER FAT CELLS
 - INCREASED CELL DEATH AND REGENERATION WITH ASSOCIATED CHRONIC INFLAMMATION
 - SUGA, ET AL, JOURNAL OF CUTANEOUS PATHOLOGY, 2009, DEC.











FOODS TO AVOID

- ARTIFICIAL SWEETNERS-.> DYSBIOSIS
- ADDITIVES
- GRAINS/GLUTEN
- SOY
- SUGARS
- UNDESIRABLE FATS-> HYDROGENATED