

肥胖症 - 21世紀新挑戰

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全球逾一億五千萬胖童

■胖童數目不斷增加，令醫學界憂慮下一代的健康。
資料圖片

【本報訊】兒童肥胖所衍生的健康問題正席捲全球。英國有專家指出，全球十分之一（即一億五千五百萬名）孩童屬超重或癡肥；香港的學者也表示，本地肥胖中小學生比例，較〇〇年上升兩個百分點，情況若不改善，心臟病、糖尿病患者恐會不斷年輕化。

糖尿病心臟病年輕化

英國倫敦衛生及熱帶藥物學院教授 Ricardo Uauy 表示，歐、美、亞太地區，以及中東和南非的胖童數目都不斷增加。在北歐及南歐，分別一至兩成及兩至三成五的兒童都是過重，美國五至十七歲兒童則有一至三成是過重。

孩童肥胖的情況在香港也甚普遍。中大醫學院兒科學系副教授黃永堅說，本港約有一成三至一成六中小學生屬肥胖，較〇〇年上升兩個百分點。他警告，若情況未見改善，因肥胖引致糖尿病、心臟病的患者將趨向年輕化。Ricardo Uauy 建議加強宣傳以防止兒童過胖，包括推廣餵哺母乳、鼓勵學校教導孩子注意飲食等。

Obesity (肥胖)

- Not a condition of excess weight, but excess of total body fat
- Overweight \neq Overfat
- Should be viewed as a chronic disease

Body fat classification

	Normal	Mild obese	Obese	Severely obese
Male	14 – 23%	25 – 30%	30 – 35%	>35%
Female	17 – 27%	30 – 35%	35 – 40%	>40%

Methods to measure body fat

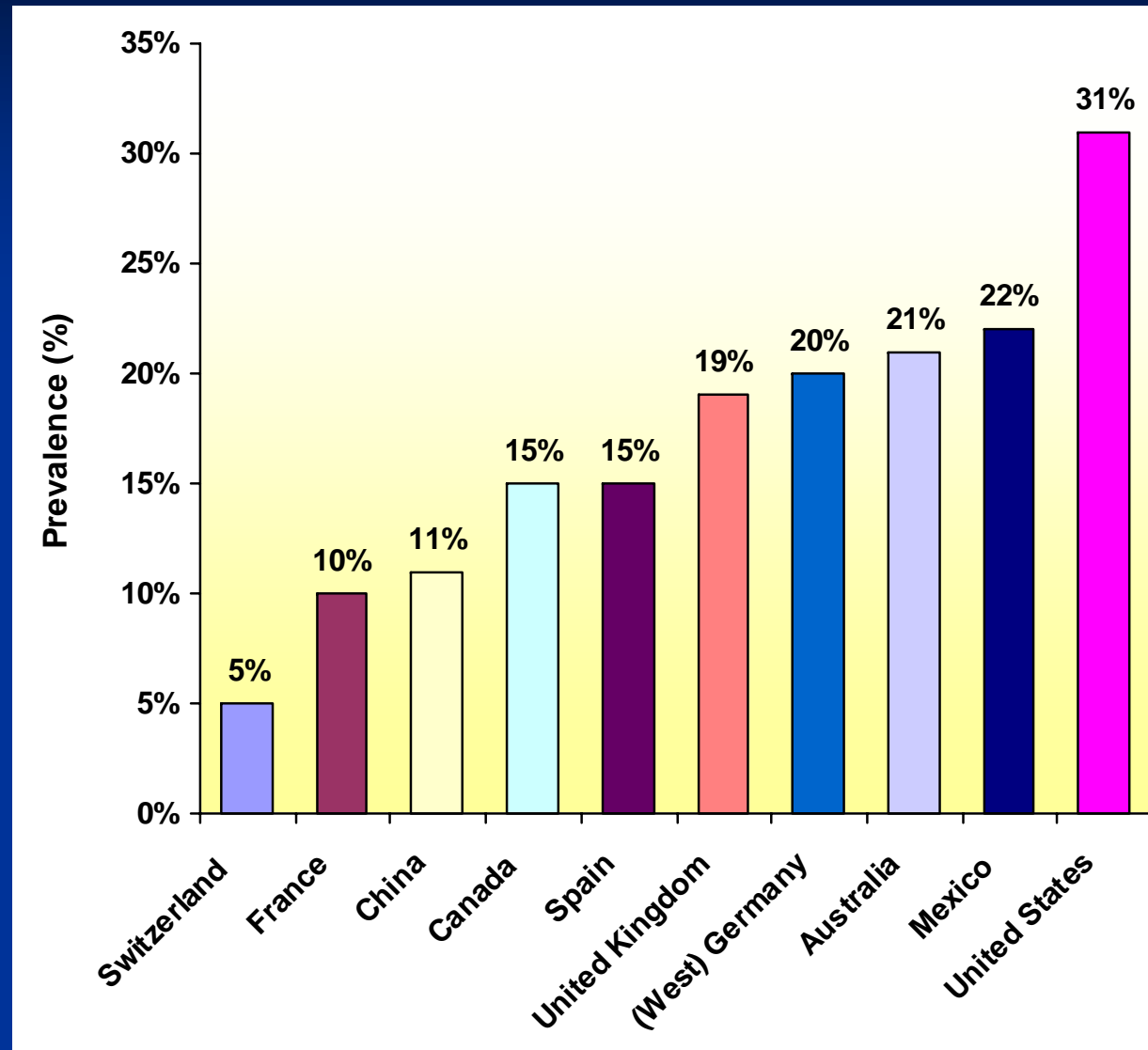
- Hydrostatic (under water) weighing
- Magnetic Resonance Imaging (MRI)
- Dual energy x-ray absorptiometry (DEXA)
- Skin-fold caliper
- Bioelectrical impedance analysis (BIA)
- Body Mass Index (BMI)
- Waist Circumference (WC)
- Waist to Hip ratio

WHO Criteria for Obesity in Asians

(WHO Western Pacific Region 2000)

		Risk of co-morbidities	
		Waist circumference	
	BMI (kg/m ²)	< 90 cm (M) < 80 cm (F)	≥ 90 cm ≥ 80 cm
Normal weight	18.2-22.9	Average	Increased
Overweight	≥ 23		
At risk	23-24.9	Increased	Moderate
Obese I	25-29.9	Moderate	Severe
Obese II	≥ 30	Severe	V Severe

The Prevalence of Obesity (BMI ≥ 30 kg/m²) Around the World



**US -- 66% overweight
-- 31% obesity**

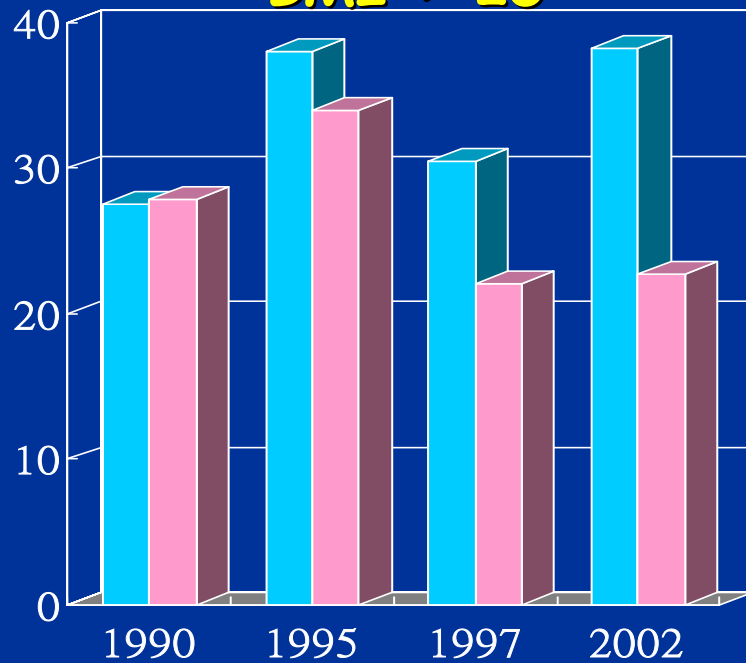
Sources: Pan American Health Organization, 2002; Schutz & Woring, 2002; Yunzhen, 2002;

Aranceta, 2003; Cameron et al., 2003; Flegal et al., 2002; Belanger-Ducharme and Tremblay, 2005; Thorburn, 2005.

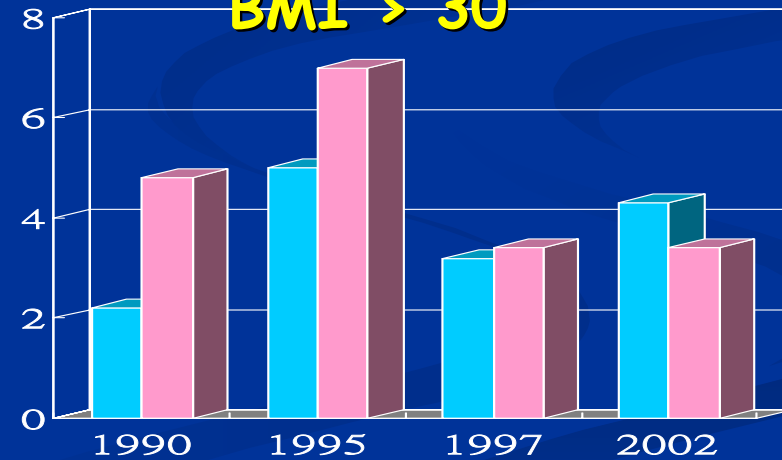
FATS AND FIGURES

Men
Women

Overweight BMI > 25



Obese BMI > 30



Source: HK Association for the Study of Obesity (SCMP 27 July, 2004)

Hong Kong Department of Health Population Health Survey 03/04 **

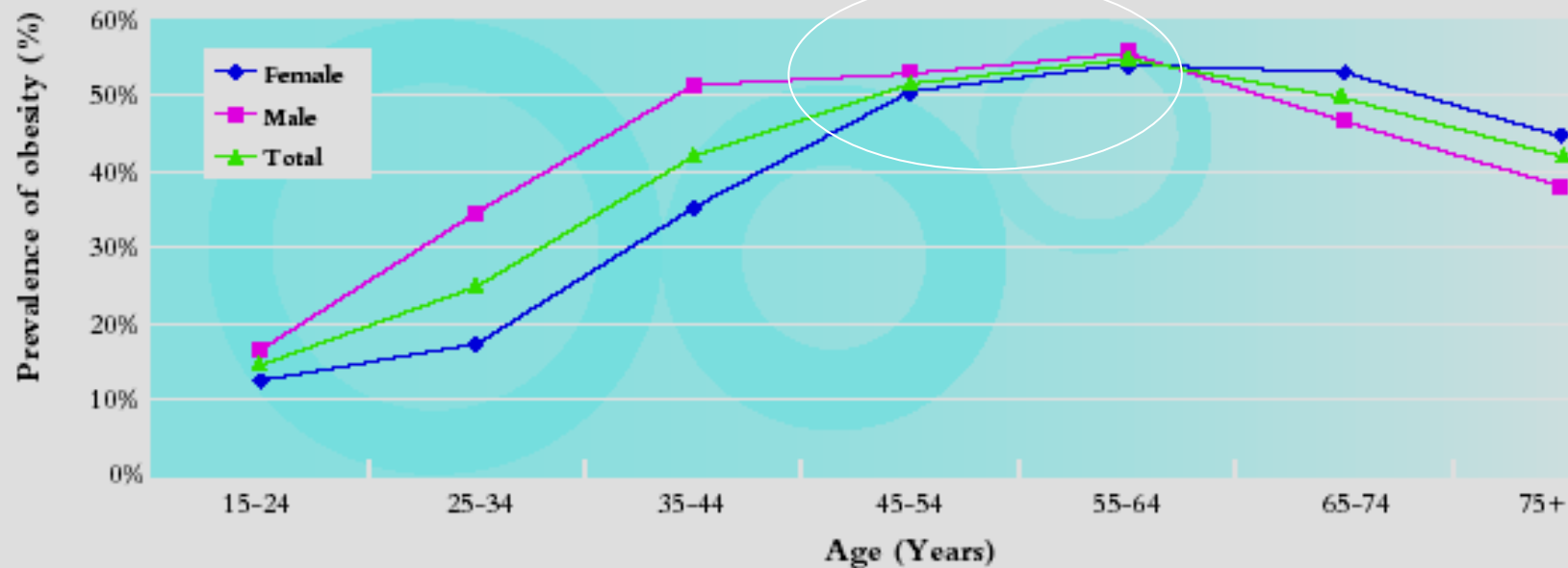
	BMI (kg/M ²)	Male	Female	Total population
Under- weight	<18.5	7.8%	12.4%	10.3%
Normal	18.5-22.9	46.8%	48.8%	47.9%
Over- weight	23.0-24.9	20.1%	15.9%	17.8%
Obese	>25.0	22.3%	20.0%	21.1%
Don't know	--	3.0%	2.9%	3.0%

**7000+ subjects ≥ 15 years of age by home visit

www.chp.gov.hk

50% of the Middle-Age Population are At Least Overweight

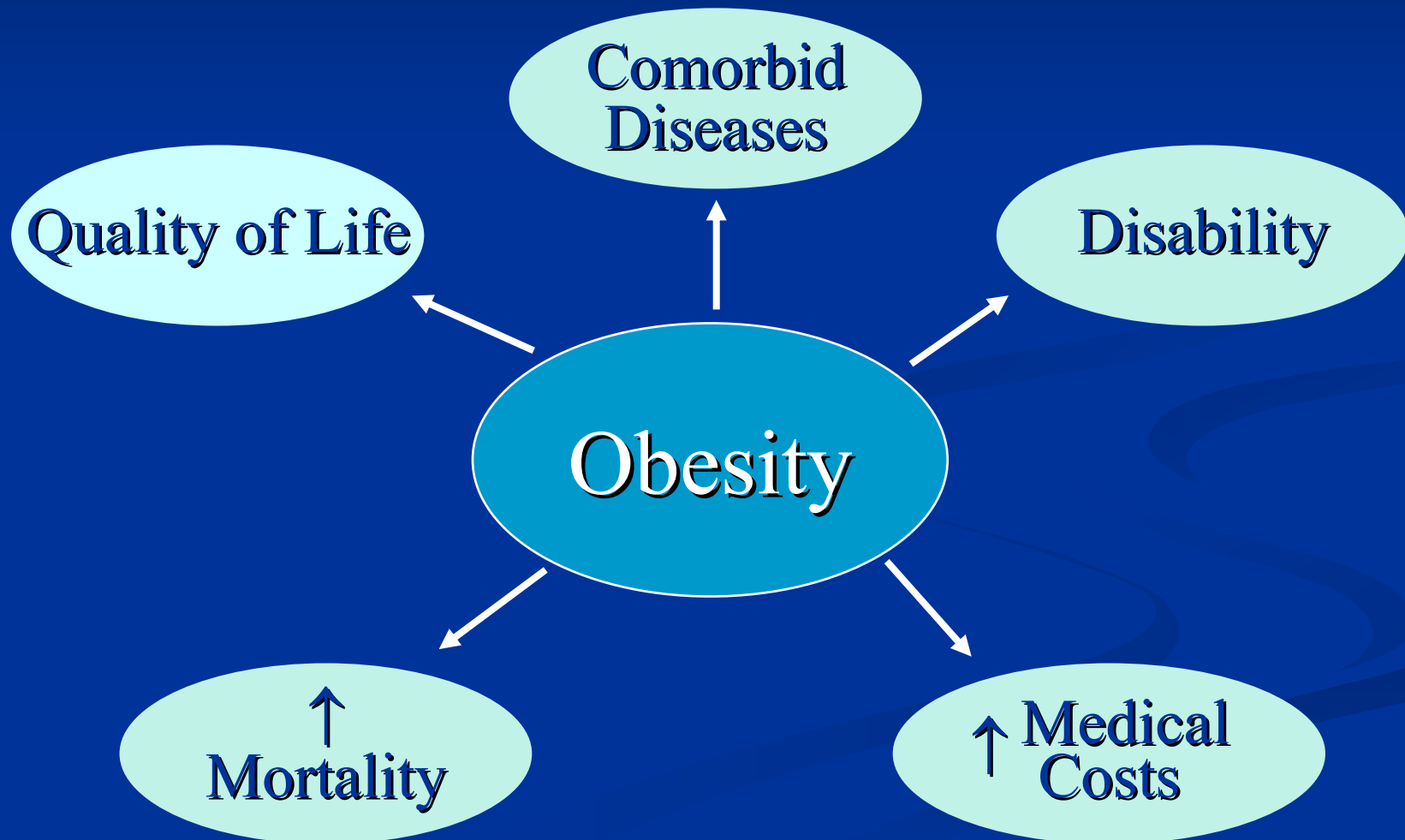
Chart 3.1 Prevalence of overweight and obesity (BMI ≥ 23) by age group and sex in Hong Kong, 2003/2004³¹



Detection Rate for Obesity in SHSC

School year	02/03	03/04	04/05	05/06	06/07
Primary school	18.6%	18.7%	18.7%	19.4%	20.2%
Secondary school	15.6%	15.8%	15.8%	16.5%	16.6%
Total	17.8%	17.9%	17.8%	18.4%	18.9%

Impact of Obesity



Health Risks of Obesity

Greatly increased

Type 2 diabetes

Dyslipidaemia

Metabolic Syndrome

Breathlessness
Sleep apnoea

Gallbladder diseases

Moderately increased

Coronary heart disease

Hypertension

Osteoarthritis

Gout

Mildly increased

Cancer

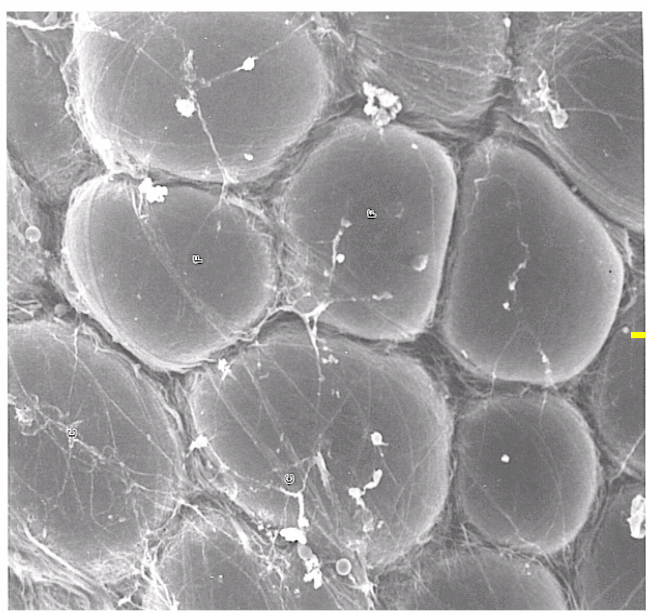
Menstrual dysfunction

Infertility

Increased anaesthetic risk

Foetal defects
(maternal obesity)

腹內脂肪是內分泌器官？



腹內脂肪

輕素 (Leptin),
脂聯素 (Adiponectin),
血管緊張素
(Angiotensinogen)

通知腦部調節進食
和消耗能量

幫助身體調節糖
和脂肪的水平

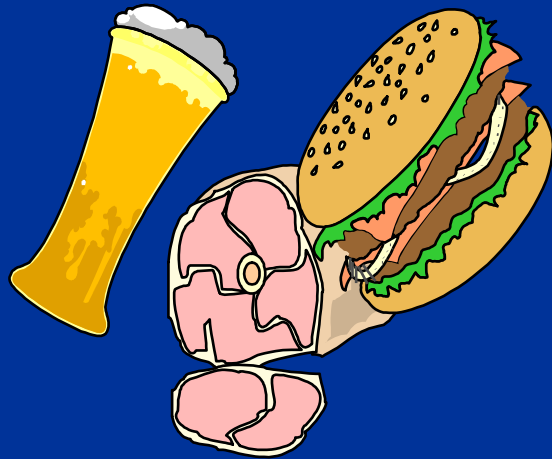
血壓提高

TNF- α , IL-6,
PAI-1 等物質

引致動脈硬化, 甚至動脈栓塞

The physiology of weight gain

Energy input



Energy output



Control factors

Genetic make-up
Diet

Exercise
Basal metabolism
Thermogenesis

要減去一磅脂肪組織
= 透過飲食及運動減少3500卡路里

To lose 1 pound adipose tissue per
week

= need to cut down 3500 kcal
through diet and exercise

What is Shaping Our Eating Habits?

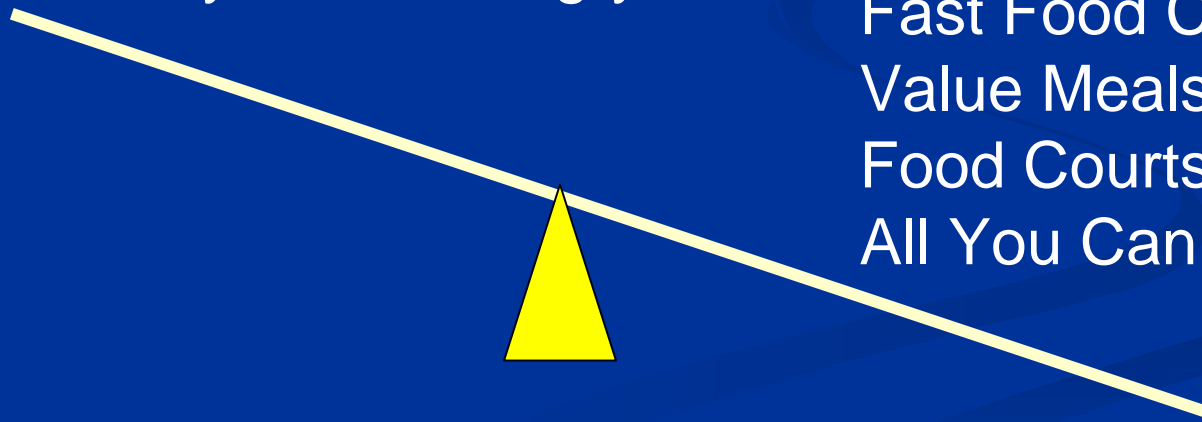
⇒ **Increase
energy input**

Should Eat Healthy Foods
Should Watch Portion Sizes
Should Cook More
Should Eat Only When Hungry

Food Availability
Abundance
Snacking
Convenience Stores
Vending Machines
Processed Foods
Cooking Less
Eating Out More
Large Portions
Fast Food Choices
Value Meals
Food Courts
All You Can Eat Buffets

Healthy Choices

Unhealthy Environment



What is shaping our physical activity habits?

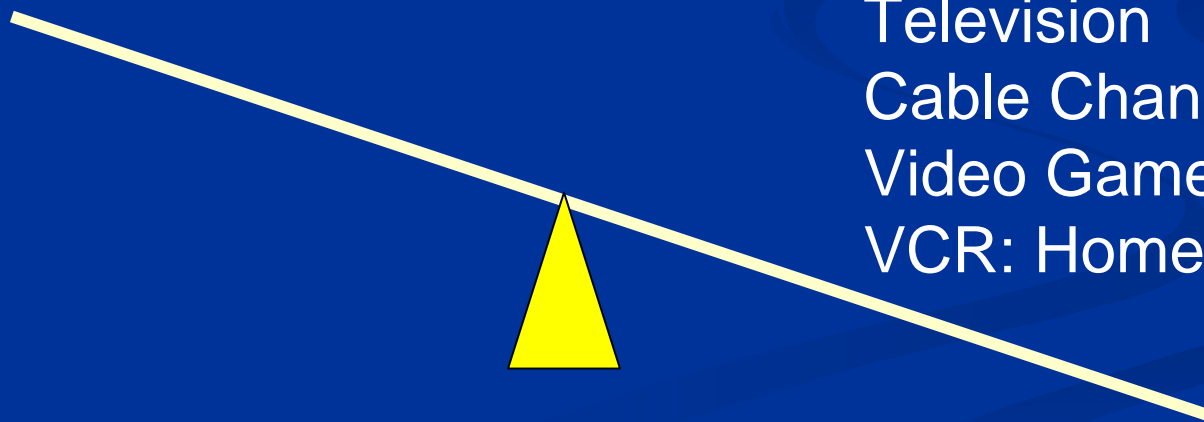
⇒ **Decrease energy input**

Should Walk Up Stairs
Should Park Car Farther Away
Should be More Active
Should Watch TV less
Should Do Less Passive Activities

Elevators
Escalators
Telephones
Snow Blowers
Remote Controls
Cars, Buses, Trains
Computers
Email
Drive-Thru Society
Television
Cable Channels
Video Games
VCR: Home Movies

Healthy Choices

Unhealthy Environment



What is shaping our coping habits?

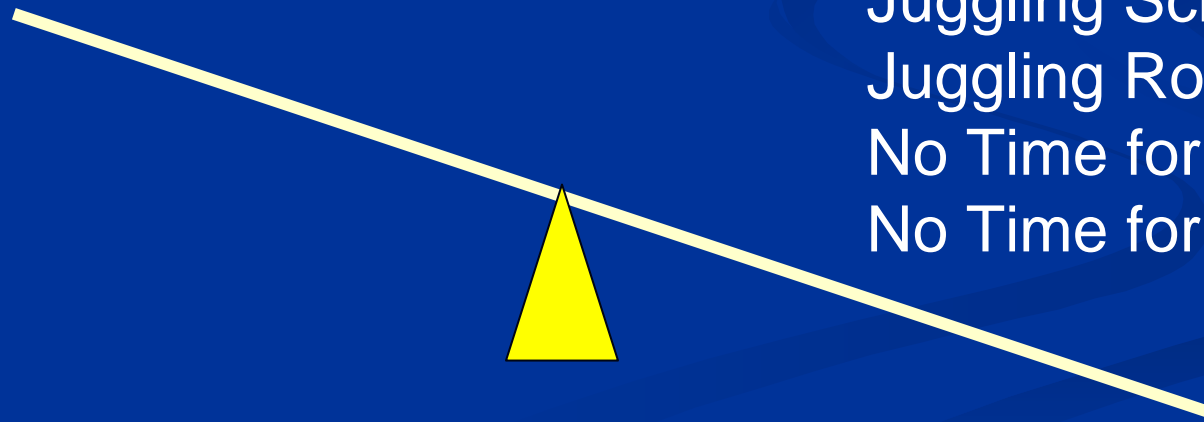
⇒ **Energy imbalance**

Should Make Time to Exercise
Should Make Time to Eat Healthier
Should Make Time to Cook
Should Make Time to Relax

Living the Hurried Life
Always Rushing
Overscheduled
Overdoing It
Not Living in the Moment
Working Longer Hours
Less Leisure Time
Family Stresses
Juggling Schedules
Juggling Roles
No Time for Family
No Time for Self

Healthy Choices

Unhealthy Environment



Obesity is a **Chronic Disease**

- Life-long problem, not curable in most cases
- Risk factor for many other diseases
- Manageable with lifestyle modifications, pharmacotherapy and surgery (in appropriate patients)
- Sustained moderate weight loss (5% to 10%) provides significant health benefits
- Realistic expectations must be established

Objective of weight control

- Reduce fat weight (not lean muscle mass)
- Maintain/ improve fitness and health

Keys to Success

- Disease Vs Beauty
- Prevention is the very first step
- Life-long commitment
- Realistic goals
- Multidisciplinary
- Progressive & steady weight loss
- Motivations
- Enjoyable
- Active self-participation



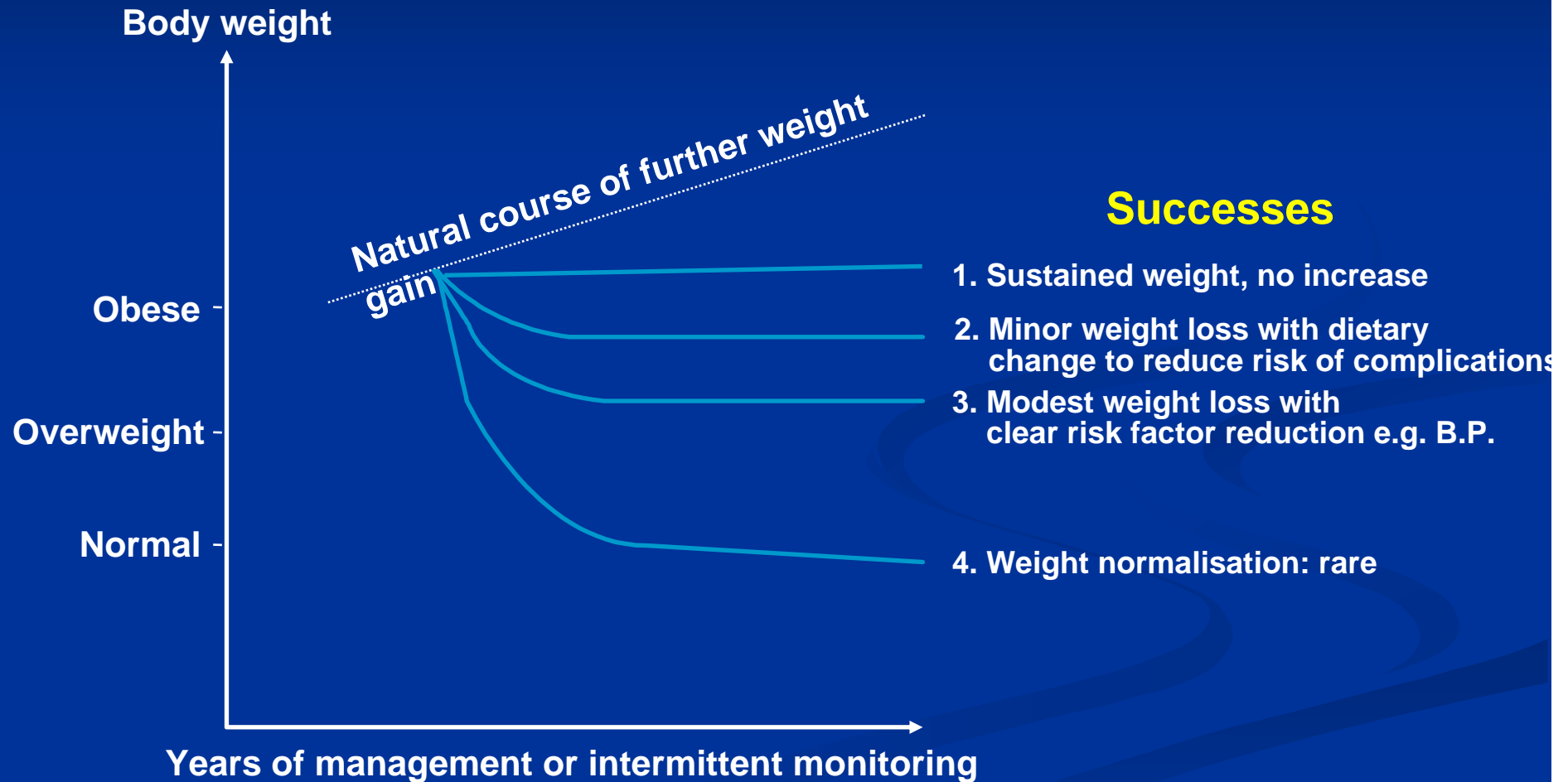
Unrealistic Goals: Average Fashion Model Vs Average Woman*

	<u>Average Fashion Model</u>		<u>Average Woman</u>
Height	5' 9"		5' 4"
Weight	110 lb		142 lb
BMI	16.3		24.3

BMI = body mass index.

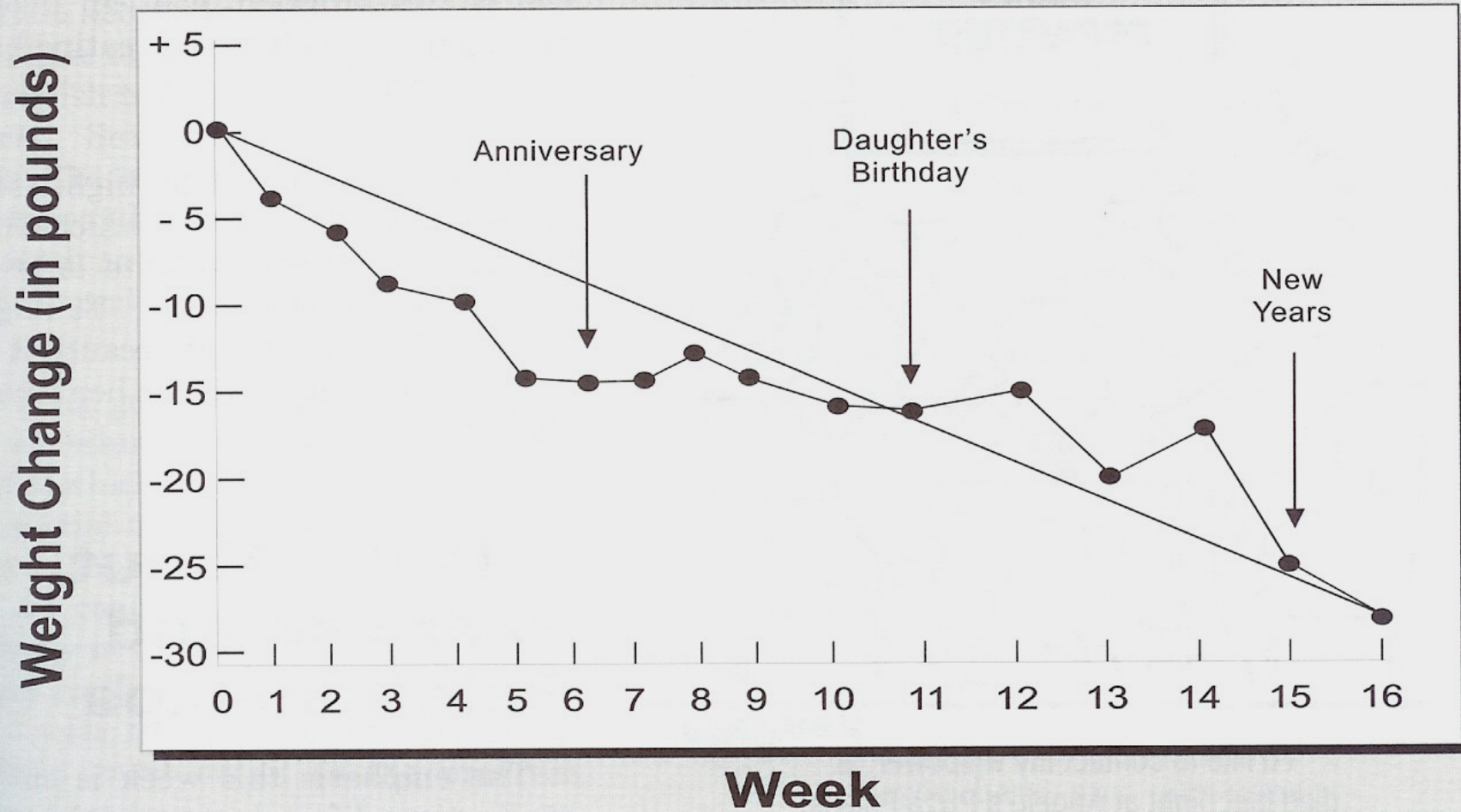
*Written communication from TA Wadden, PhD, July 1997.

The Management of Obesity

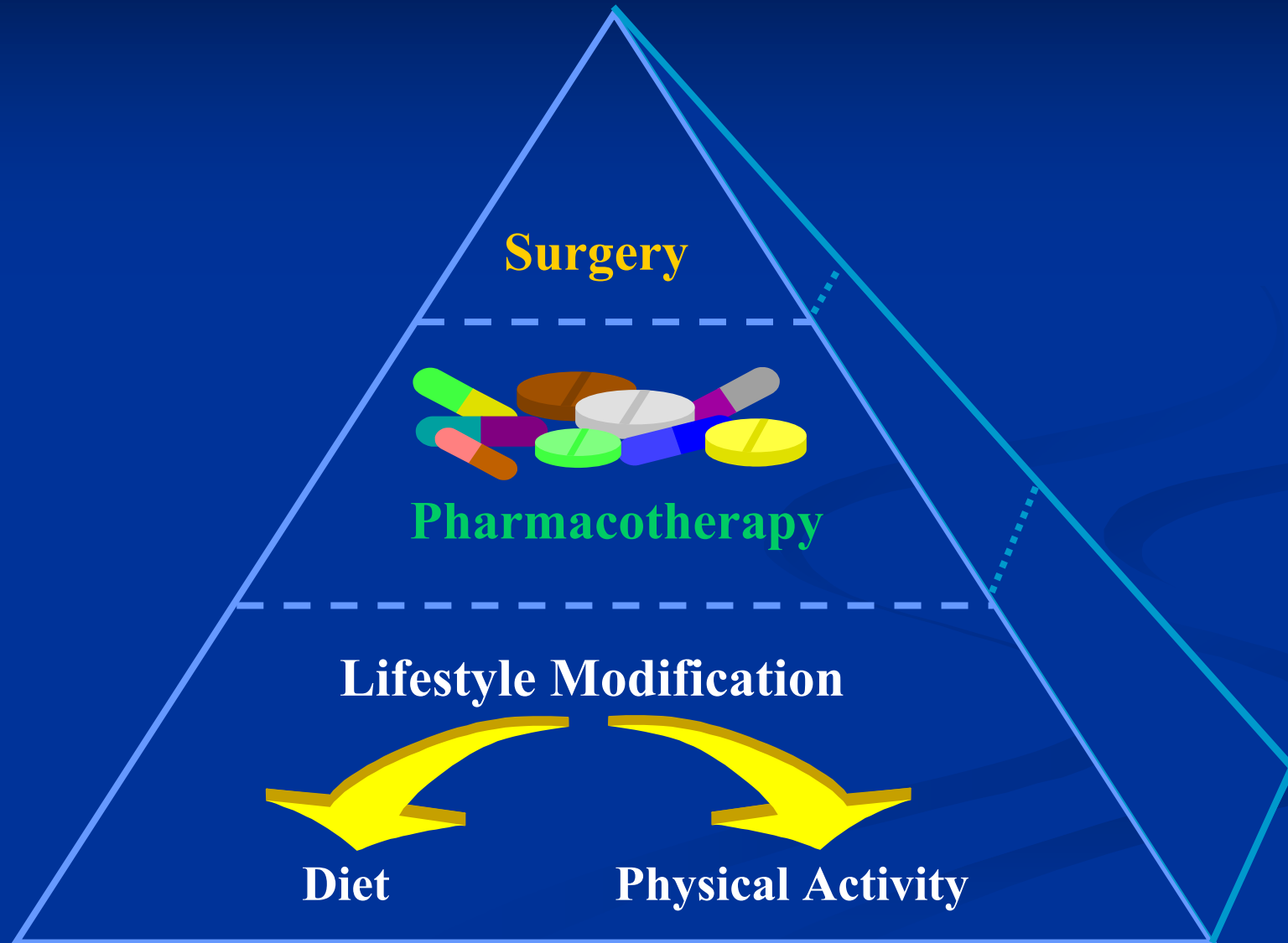


Adapted from Rössner, 1997

Sample Weight Change Record



Obesity Treatment Pyramid

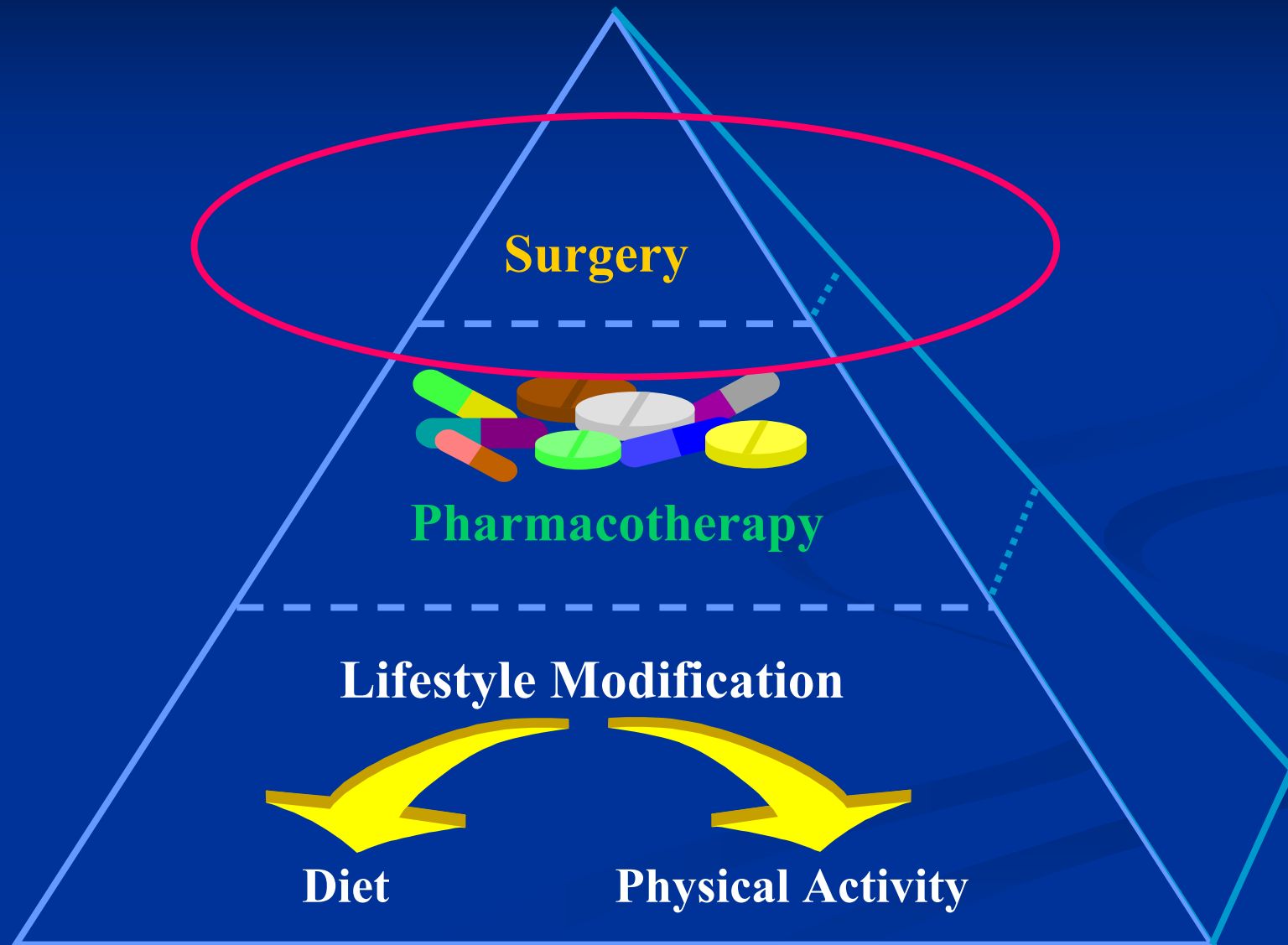


The Weight Management Team Approach

Primary Care Provider
Nurse
Nurse Practitioner
Diabetes Educator
Support Groups/
Tailored Programmes

Obesity Specialist
Registered Dietitian
Physician Assistant
Fitness Counsellor
Pharmacist
Clinical Psychologist

Obesity Treatment Pyramid



Surgery

Pharmacotherapy

Lifestyle Modification

Diet

Physical Activity

Weight Loss (bariatric) Surgery

- Failure of less invasive weight reduction methods
- Induce weight loss by mechanical restriction +/- malabsorption

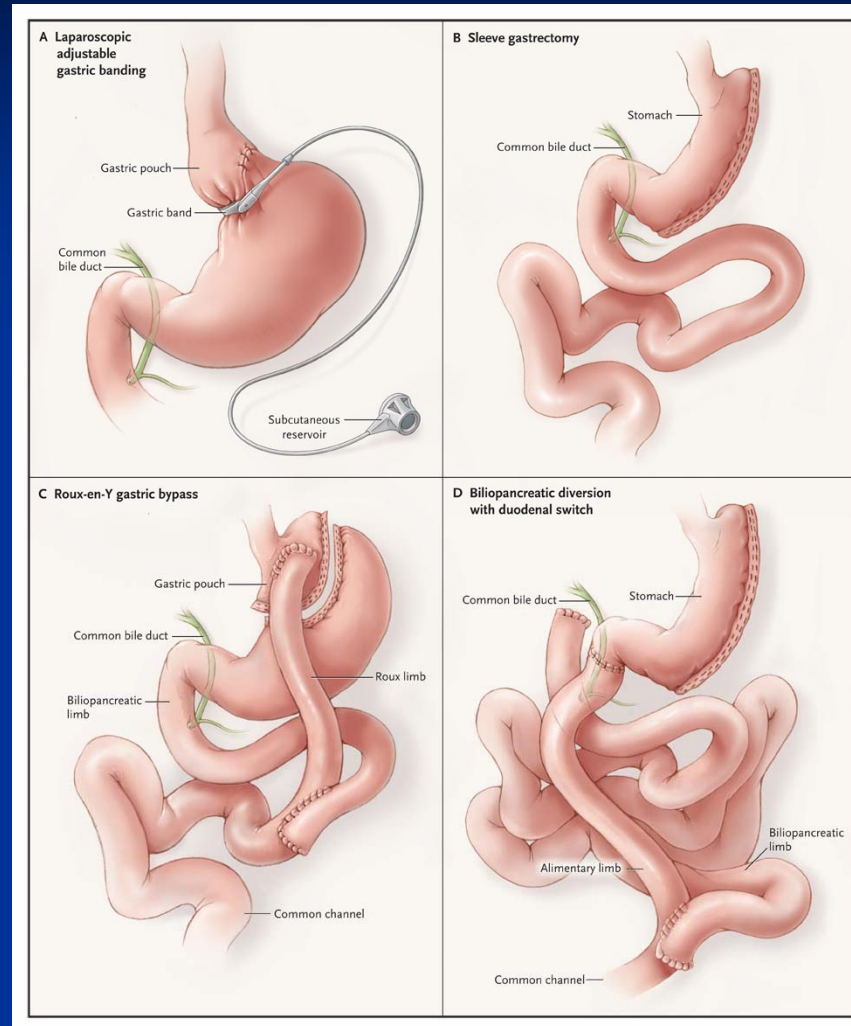
Patient Selection

- Age 18 - 55

AND

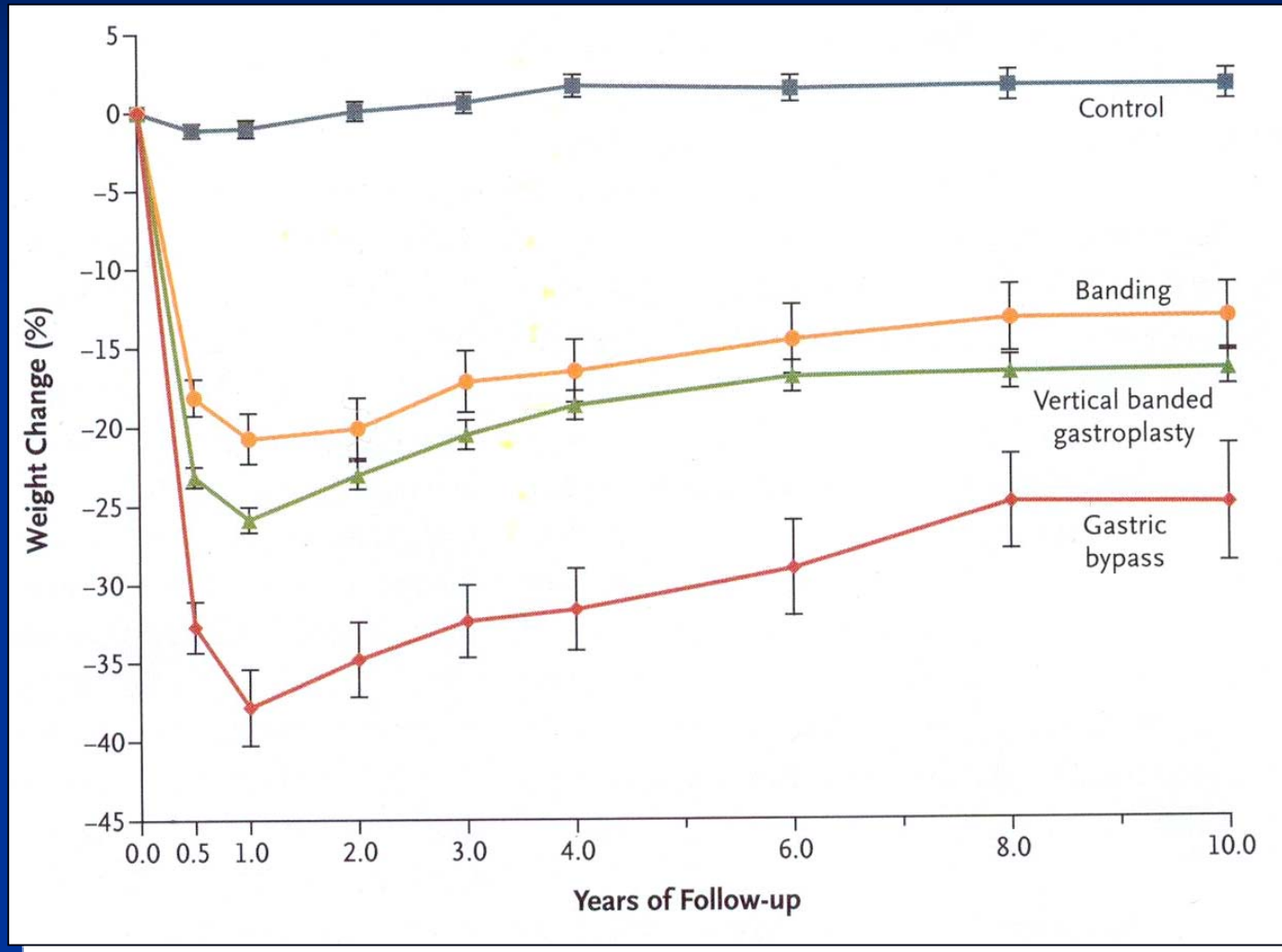
- BMI ≥ 40 kg/m² OR
- BMI 35 - 40 kg/m² with
 - High risk health problems OR
 - Obesity-induced physical problems
- Understands surgery and risks
- Acceptable operative risks (patient and procedure)
- Stable psychological condition

Common Surgical Procedures for Weight Loss



DeMaria E. N Engl J Med 2007;356:2176-2183

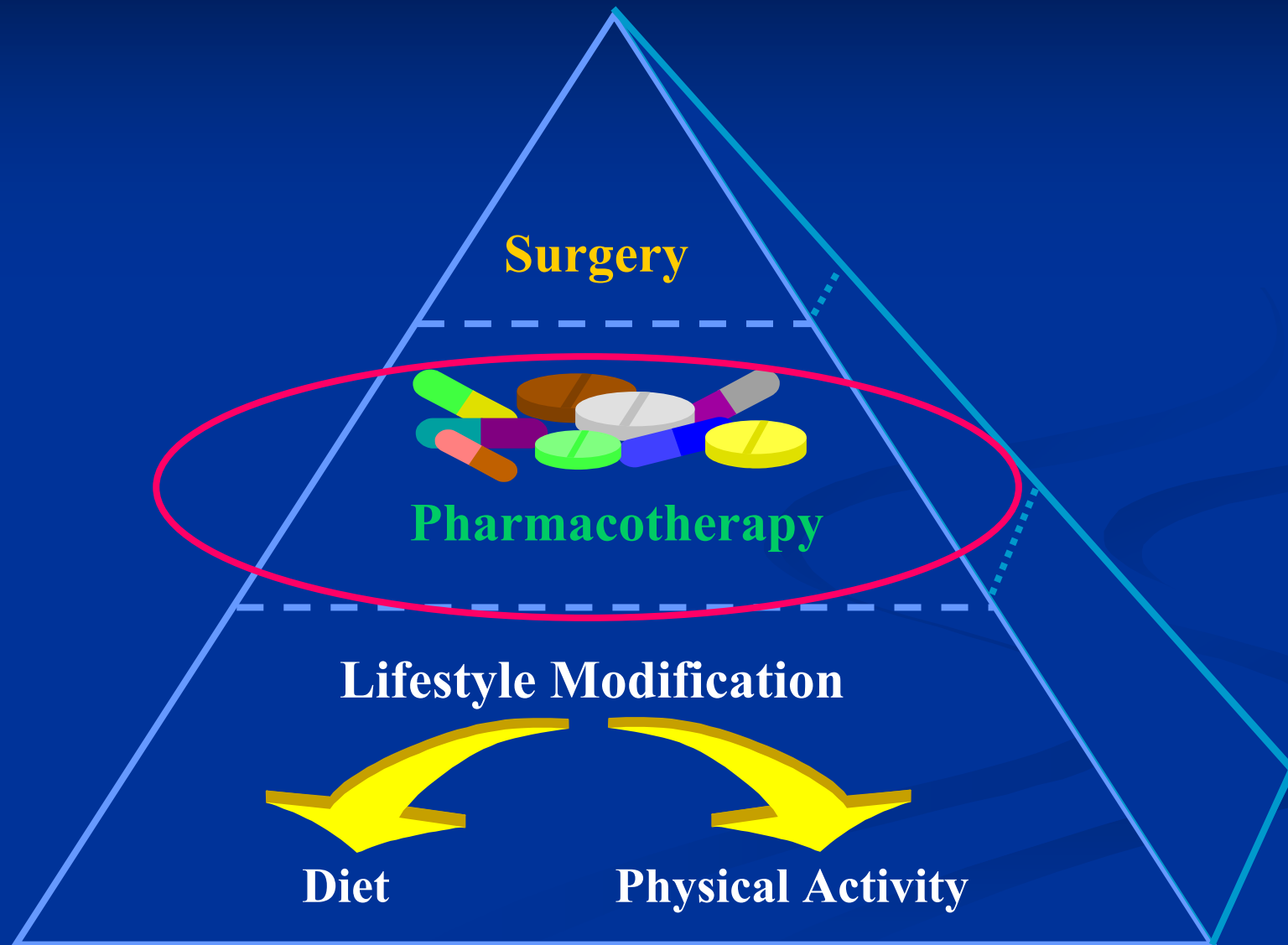
Weight Maintenance after Bariatric Surgery



Liposuction

- Not considered for weight reduction
- Cosmetic surgical procedure
- Removes localized deposits of fat to reshape the body in normal size individuals
- Not an effective way to attain significant or long term weight loss
- Risks: blood clots, perforation injury, skin and nerve damage, infection

Obesity Treatment Pyramid



Pharmacotherapy for obesity

- Obesity should be considered as a chronic disease
- As an adjunct to a combination of caloric restriction, exercise and behavior modification
- lead to an average weight loss of 5-22 lbs above that of non-drug treatment
- Max weight loss occurs within 6 months of starting medication
- Two broad groups:
 - I. Those acting on the central nervous system to influence appetite
 - II. Those acting on the gastrointestinal system to reduce absorption

Weight Management Drugs: Mechanisms Of Action

Energy Balance Equation

Reduce Energy Intake



hunger



satiety



nutrient absorption

Increase Energy Expenditure



metabolic rate

Sibutramine



Side effects: ↑blood pressure,
↑pulse, Dry mouth, Headache,
Insomnia, constipation

Dosage: 5,10,15mg

Action: Appetite suppressants works by increasing the availability of anorexigenic neurotransmitter – norepinephrine, serotonin, dopamine, enhance satiety and thermogenesis

Contraindications:

Uncontrolled HT, severe renal / hepatic impairment, glaucoma, coronary artery disease, congestive heart failure, arrhythmia or stroke

Orlistat (Xenical)



Dosage: 120mg tds

Take with or up to one hour after meals

Action:

-Inhibit the pancreatic lipases, preventing hydrolysis of dietary fat into absorbable free fatty acids and monoacylglycerols

-1/3 of the dietary fat ingested being excrete in the stool

Side effects:

Flatulence with discharge, fecal urgency, fecal incontinence, steatorrhoea, oily spotting, increase frequency of defecation

Decrease absorption of fat-soluble vitamins, suggest multivitamin administration at least 2hr before or after a dose of orlistat

Contraindications:

Chronic malabsorption syndrome, cholestasis

Combination of Sibutramine and Orlistat ?



Effects of sibutramine plus orlistat in obese women following 1 year of treatment by sibutramine alone: a placebo-controlled trial. *Obes Res* 2000 Sep;8(6):431-7.

Efficacy of sibutramine, orlistat and combination therapy on short-term weight management in obese patients. *Biomed Pharmacother.* 2004 Dec;58(10):582-7.

More weight loss with sibutramine than orlistat

No additional benefit if orlistat is added to sibutramine compared with sibutramine alone

Long term use of anti-obesity drugs?

The maximal duration of published treatment results:

2 years for sibutramine

4 years for orlistat

If patient response is good, and the patient wishes to continue, this may be considered after acknowledging the lack of longer term data and obtaining the patient's willingness to continue

Rimonabant (Acomplia)



Dosage: 20mg daily

Action:

a selective cannabinoid receptor type 1 (CB1) blocker

Blocking CB1 receptor leading to reduce food intake, weight reduction and improvement in cardiovascular risk factors

Contraindication:

patient with ongoing major depression or taking antidepressants

Rimonabant (Acomplia)



Suspended from marketing since Oct 2008

Risk of psychiatric side effects like depression, sleep disorders, anxiety and aggression is approx. doubled in patients taking Acomplia compared to placebo

More cases of suicide in patient taking Acomplia vs placebo

New Agents



Exenatide (Byetta)

Exenatide: An Incretin Mimetic

Exenatide (Exendin-4)

- Synthetic version of salivary protein found in the Gila monster
- Approximately 50% identity with human GLP-1
 - Binds to known human GLP-1 receptors on β cells *in vitro*
 - Resistant to DPP-4 inactivation



Enhances glucose-dependent insulin secretion

Reduces postprandial glucagon secretion

Slows gastric emptying rate

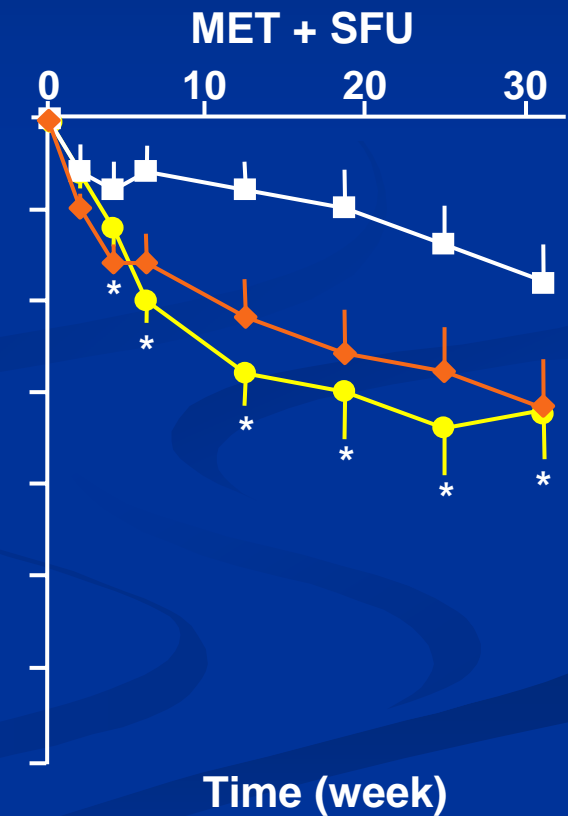
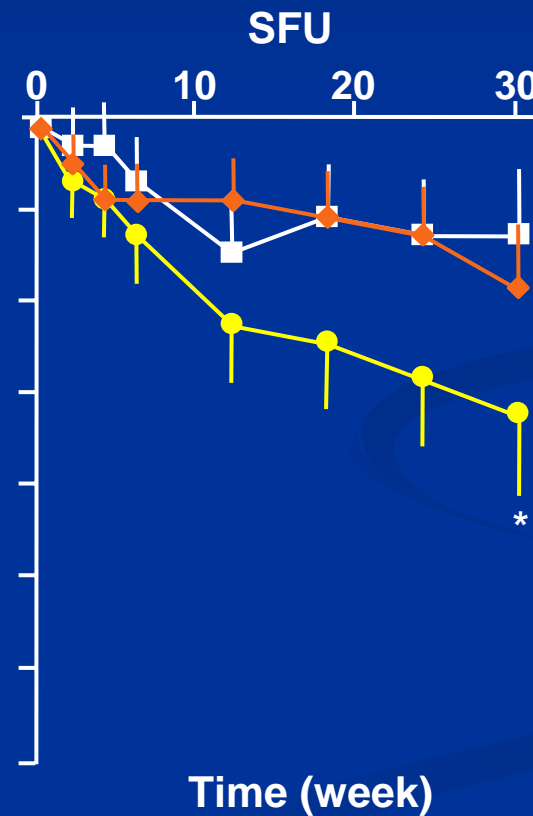
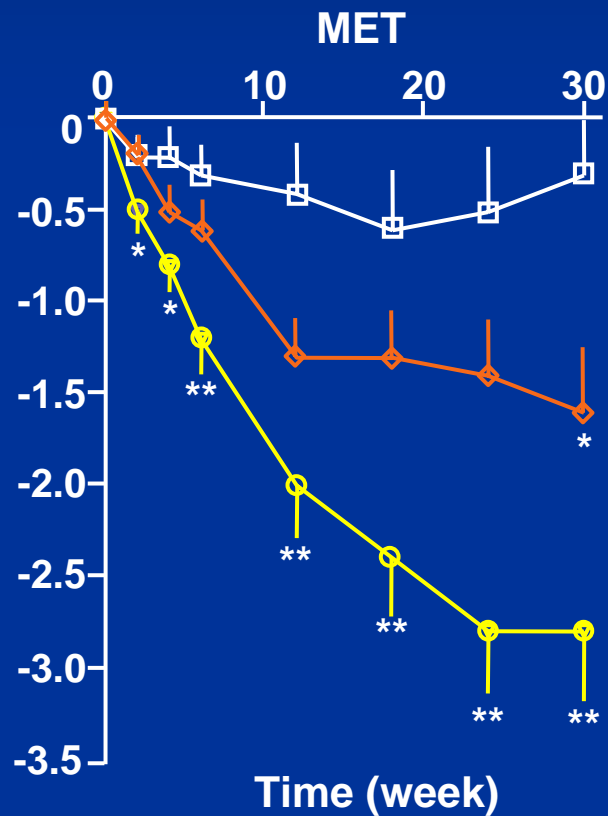
Reduces food intake and body weight

Restores first phase insulin response

Increases beta-cell mass (animal models) and markers of beta-cell function

Large Phase 3 Clinical Studies: Exenatide Reduced Body Weight Over 30 Weeks

- Placebo BID
- ◆ Exenatide 5 μ g BID
- Exenatide 10 μ g BID



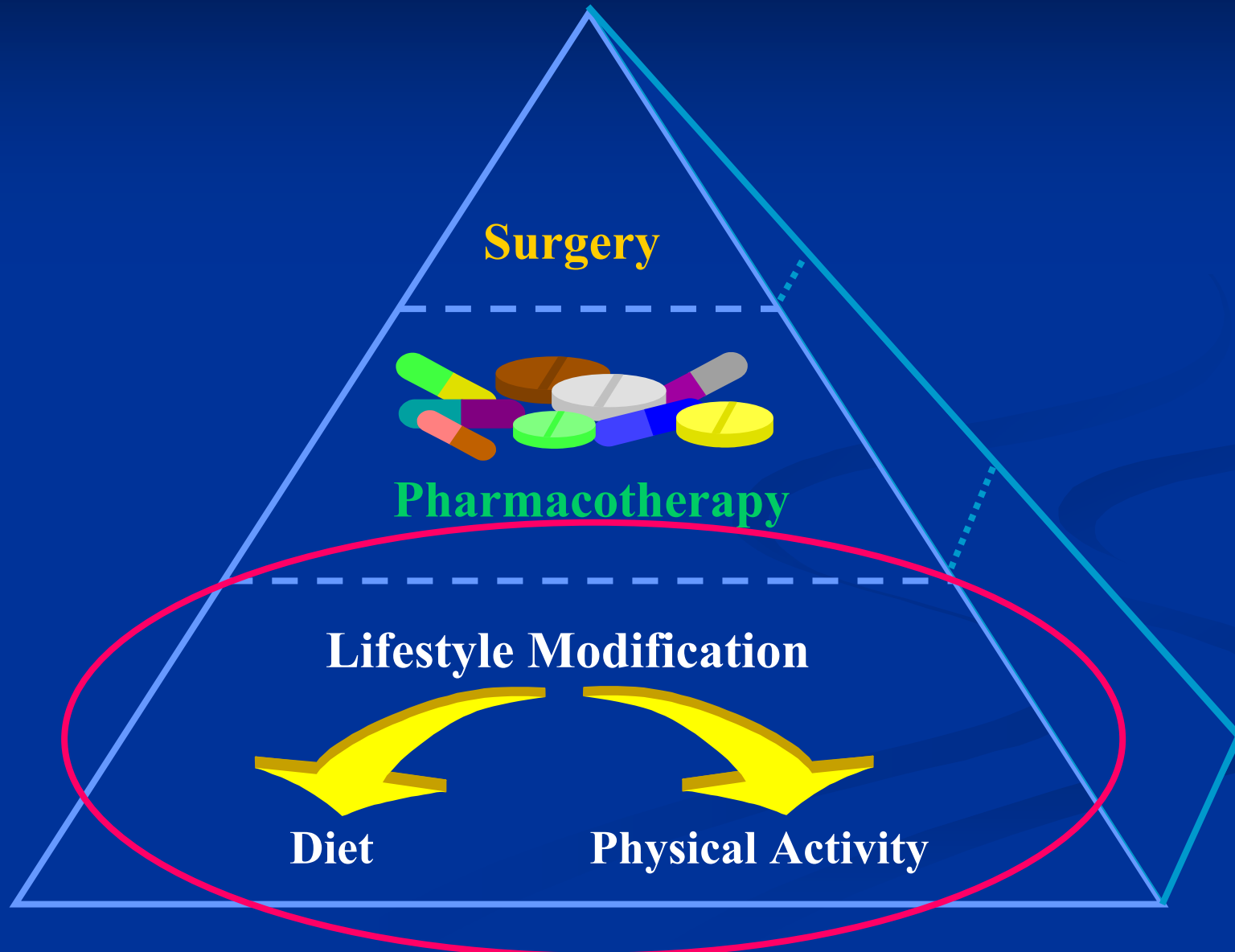
Drugs not appropriate for the treatment of obesity

- Diuretics
 - Adverse effects: electrolyte imbalance, dehydration, arrhythmia
- Laxatives
 - Adverse effects: electrolyte imbalance, dehydration, poor bowel mobility, diarrhea, abdominal pain
- Fiber capsules
 - Adverse effects: constipation
- Chitosan
 - Adverse effects: constipation
- Thyroxine
 - Adverse effects: tachycardia, arrhythmia, insomnia, death

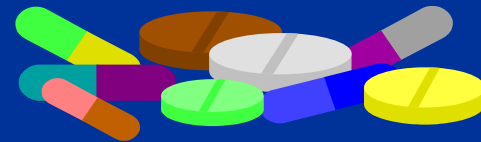
PHARMACOTHERAPY IN OBESITY MANAGEMENT

- Drug therapy can be used as part of a multidisciplinary weight reduction programme for selected overweight and obese individuals
- Need to confirm safety and efficacy of long-term drug treatment
- Drug therapy should be administered under strict medical supervision to minimize adverse effects

Obesity Treatment Pyramid



Surgery



Pharmacotherapy

Lifestyle Modification



Diet

Physical Activity

The only magic “pill”
is permanent life-style
modifications – a
combination of healthy
diet and exercise

Rule of thumb- energy requirement

- Sedentary activity/
Elderly/ Wt loss



20-25 kcal / kg body weight

- Moderate activity



25-30 kcal/ kg body weight

- Heavy activity



30-40 kcal/kg body weight

Example: a 45 -year-old man w/ a wt of 80 kg aims for weight loss of 0.5 kg per week may need about 1600 kcal/d

Different Types of Diets for Weight Reduction

A - Atkins diet

D - Detox diet

E - Elemental diet

F - Fat Smash diet
- Fit for Life diet

G - G.I. Diet

L - LEARN diet
- Low-carbohydrate diet

M – Mediterranean diet

O – Ornish diet

S – South Beach diet

V – Very low calorie diet

W - Weight watchers

Z – Zone diet

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Comparison of Weight-Loss Diets with Different Compositions of Fat, Protein, and Carbohydrates

Frank M. Sacks, M.D., George A. Bray, M.D., Vincent J. Carey, Ph.D., Steven R. Smith, M.D., Donna H. Ryan, M.D., Stephen D. Anton, Ph.D., Katherine McManus, M.S., R.D., Catherine M. Champagne, Ph.D., Louise M. Bishop, M.S., R.D., Nancy Laranjo, B.A., Meryl S. Leboff, M.D., Jennifer C. Rood, Ph.D., Lilian de Jonge, Ph.D., Frank L. Greenway, M.D., Catherine M. Loria, Ph.D., Eva Obarzanek, Ph.D., and Donald A. Williamson, Ph.D.

811 overweight adults randomized into 1 of 4 diets, each with 750kcal / day deficit but with different percentages of energy derived from fat, protein and carbohydrates

	Fat	Protein	Carbohydrate
Diet 1	20%	15%	65%
Diet 2	20%	25%	55%
Diet 3	40%	15%	45%
Diet 4	40%	25%	35%

Follow up for 2 years

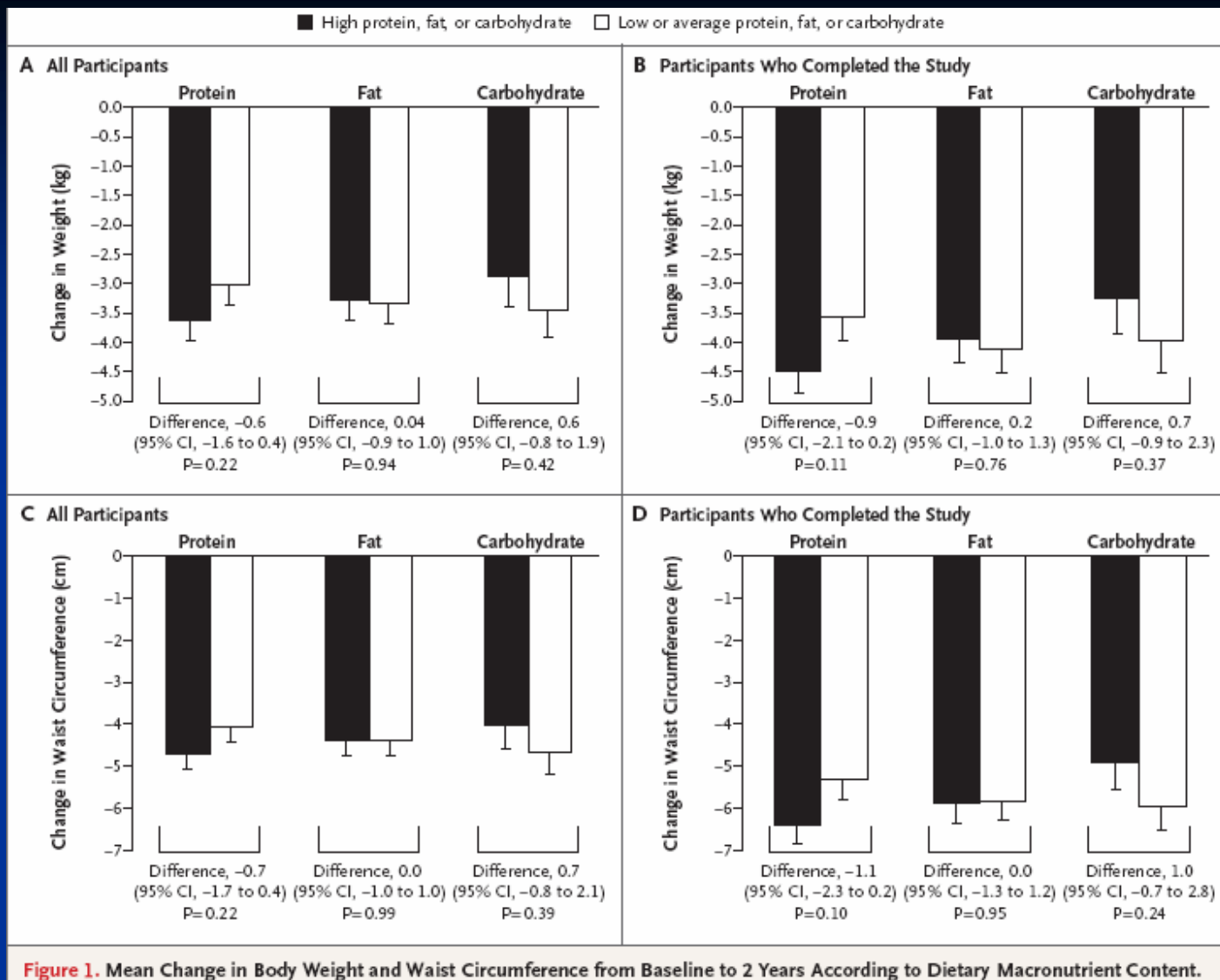


Figure 1. Mean Change in Body Weight and Waist Circumference from Baseline to 2 Years According to Dietary Macronutrient Content.

80% of participants complete the trial

Average weight loss 4Kg with $p > 0.2$ for all comparison

Satiety, hunger, satisfaction with the diet, and attendance at group sessions were similar for all diets

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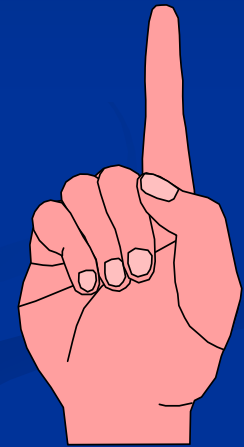
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Conclusion:

-Reduced-calorie diets result in clinically meaningful weight loss regardless of which macronutrients they emphasize

What is Practical?

- A decrease in calorie intake is the **MOST** important component of weight loss and maintenance.
- Formulas are an estimate not exact science
- Researches show most overweight patients can lose weight on 1200-1500 kcal/day
- Tailor to meet the needs of patients
- Should be reviewed on the basis of weight loss progress



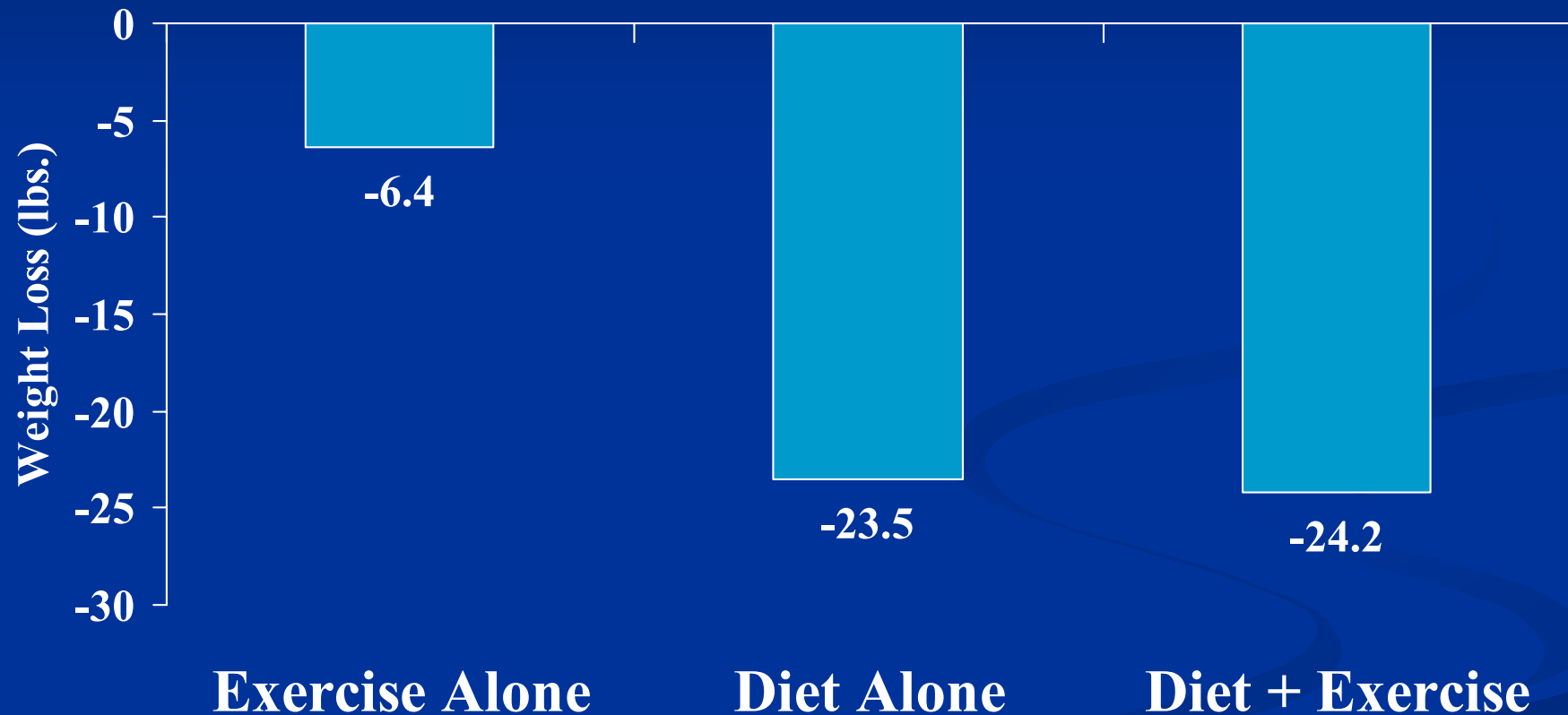
What is Practical?

- Difficult to maintain nutritional adequacy with daily energy level <1200 kcal
- Daily energy intake must be realistic to follow
- Vitamin and mineral supplements may be required if daily caloric intake <1200 kcal

Role of physical activity in weight management

- Extremely important part of weight management program
- Contribute to an energy deficit
- Prevent weight gain
- Important for increase of lean body mass
- Is essential for long-term weight loss maintenance

Meta-analysis of 493 studies looking at exercise versus diet



Why is diet “more effective” than exercise in weight loss?

	Energy (kcal)	Reading (min.)	Walking (min.)	Running (min.)
Soft drink 1 pkg	127	76	24	8
Diet drink 1 can	1	<1	<1	<1
Egg tart 1 pc	209	125	40	13
Apple 1 pc	89	54	17	6

Based on a 70kg person

Energy Expenditures in Various Activity

(based on a 150-pound person)

Activity	Total Calories Used per hour
Sitting and standing	25-35
Walking Slowly (2 1/2 mph)	210-230
Brisk Walking (4 mph)	250-345
Jogging (6 mph)	315-480
Cycling	315-480
Tennis	315-480
Swimming	480-625

Barriers of exercise

- I am not interest in exercise
- I don't have the time to exercise
- I am too tired to exercise
- I don't have a convenient place to exercise
- I am too out of shape to exercise

消耗熱量活動推介

約消耗150卡路里(3茶匙油)

- 抹車及打蠟45至60分鐘
- 抹窗及掃地45至60分鐘
- 在30分鐘內踏單車5公里
- 跳健康舞或社交舞30分鐘
- 游泳20分鐘

消耗熱量活動推介

約消耗150卡路里(3茶匙油)

- 打籃球15至20分鐘
- 跳繩15分鐘
- 來回上落樓梯15分鐘
- 在15分鐘內跑步1.5公里(即四個圈運動跑步場)

Pedometer (step counter)

- Use simple step counter (not to worry about miles and calories)
- Short-term goal: Find average daily base and increase 200-500 steps per day each week
- Long-term goal: 10000-12000 steps per day



一週飲食及運動日記

請參考以下例子有助你填寫飲食及運動日記，每次覆診見營養師時，請帶回此日記。

	時間	地點	食物份量及煮法	體重
早餐	8時	家	火腿三文治 1 份+ 脫脂奶 1 杯	65 公斤
小食	--	--	--	
午餐	1時	出外	雲吞麵 1碗 + 炆菜 (走油) 1碟	運動 急行 1小時
小食	4時	辦公室	橙 1 個	
晚餐	7時	家	白飯 1 碗 + 上湯芥蘭 1 碟 + 蒸魚 2 兩 + 切雞 1兩 (去皮) + 蘋果1 個	情緒 輕鬆
小食	10時	家	脫脂奶 1 杯	

Obesity is a Life-long Chronic Disease – Prevention is the Key!



Small Changes Approach

- Big changes have not worked – poor success even at getting people to start extra exercise 20 minutes a day
- Small changes – start where people are now and more is better
- Additional 30 minutes of walking already enough to prevent future weight gain
- 60-90 minutes of walking may be required to maintain weight loss

(www.americaonthemove.org)

Hong Kong Association for the Study of Obesity

www.hkaso.org

