

Week 1

The History of Sports Nutrition

Time Line of Nutritional Practices in relation to Sport and Performance

16th Century - Leonardo da Vinci compares metabolism in the body to the burning of a candle

1747 - Mid 18th Century

- Dr. James Lind conducts the first scientific nutrition experiment
- Finds citrus fruits prevent scurvy (vitamin C deficiency)

1770 - Late 18th Century

- Antoine Lavoisier (“Father of Nutrition and Chemistry”) discovers how food is metabolised
- Demonstrates that animal heat comes from combining food and oxygen, producing heat and water

1801 - Early 19th Century

- Discovery that foods are mainly composed of carbon, nitrogen, hydrogen, and oxygen
- Methods developed to measure amounts of these elements in food

1840 - Mid 19th Century

- Justus von Liebig studies chemical makeup of carbohydrates, fats, and proteins
- Finds: carbohydrates = sugars, fats = fatty acids, proteins = amino acids
- Initially thought protein was the main fuel for muscle contraction - later shown that carbohydrates and fats are primary fuels

1912 - Early 20th Century

- Dr. Casmir Funk coins the term “vitamins” (vital + amine)
- Identifies vitamins as vital factors in diet, preventing diseases like scurvy, beriberi, pellagra

1950 - Mid 20th Century

- Nutritional science accuracy improves with isotopes and muscle biopsies to measure muscle glycogen

1960 - Mid to Late 20th Century

- Functions of essential nutrients in the body are clarified.
- Vitamins and minerals recognised as critical components of enzymes and hormones

2000 - Early 21st Century

- Continued research into diet-health relationships
- Rise in processed food consumption, obesity, and chronic disease
- **In sport:** small performance gains from diet recognised; supplement use increases

What is nutrition and how is it related to our health?

Nutrition and Chronic Disease

Short-term Benefits of Good Nutrition

- Higher energy levels
- Improved digestion
- Enhanced sport recovery & injury prevention
- Better focus, cognition, mood, and sleep
- Improved blood flow & blood sugar regulation
- Healthier skin, hair, and nails

Long-term Effects of Poor Nutrition

- Type 2 diabetes, heart disease, cancers
- High blood pressure, dementia, osteoporosis
- Crohn’s disease, ulcerative colitis
- Varicose veins, haemorrhoids, diverticulosis, gout

Cancer & Nutrition

- **Prevention:** Diet impacts cancer risk, especially in digestive tract organs. Carcinogens (e.g. HCAs) and repeated exposure to harmful foods/pathogens can cause damage (e.g. GORD, ulcers)

- **Treatment:** During chemo/hospitalisation/surgery - poor appetite, nausea, vomiting, taste loss, and cachexia (muscle & weight loss) common
- **Recovery:** Adequate nutrition aids muscle mass restoration & energy recovery

Heart Health

- **Mediterranean diet:** High α -Linolenic acid, whole foods, low processed foods
- **Fruits & vegetables:** Phytochemicals & antioxidants
- **Soy foods:** Isoflavones & protein - regulate blood lipids, reduce clot risk, improve vascular function
- **Wholegrains:** Soluble fibre lowers LDL cholesterol. Low-GI foods aid blood sugar control, insulin sensitivity, and reduce hyperlipidaemia & hypertension

Gut Disorders

- **IBD (Crohn's, Ulcerative Colitis):** Inflammation of lower digestive tract; symptoms include pain, diarrhoea, weight loss, fever
 - ◆ **Treatment:** High Omega-3 intake; limit caffeine, gastric stimulants, creamy foods, chilli, garlic
- **Diverticulosis / Diverticulitis:** Avoid small/trigger foods; chew thoroughly
- **IBS:** Affects ~1 in 7 people

Eyesight

- Poor long-term nutrition can cause macular degeneration, glaucoma, cataracts

The average Australian diet

Factors affecting what we eat

Main influences:

Family/friends

Culture/religion

Cost

Availability/convenience

Health (special diets, sport etc.)

Emotions

Physiological factors

- Hunger/appetite regulated by ghrelin & leptin
- Satiety depends on macronutrients (protein, fat, fibre)
- Age, gender, energy needs affect portions and choices
- Genetics influence taste, body shape, allergies/intolerances

'Live to Eat' (food for enjoyment, social contexts) vs 'Eat to Live' (nutrition for function/performance (e.g. elite sport))

The Australian Dietary Guidelines and the Australian Guide to Healthy Eating

Australian Dietary Guidelines (ADG)

Overview

- Based on latest scientific evidence
- Aim - Informs on food types, amounts, and patterns to:
 - ◆ Promote long, healthy life
 - ◆ Reduce risk of diet-related conditions (cholesterol, BP, obesity)
 - ◆ Reduce chronic disease risk (type 2 diabetes, CVD, cancers)
- Audience → Health professionals, policymakers, educators, food industry, researchers (so they can find ways to help Australians eat healthy diets)
- Applies to → All healthy Australians & those with common conditions (e.g. overweight)

→ Excludes → People needing special medical diets & frail elderly

Australian Guide to Healthy Eating (AGHE)

- Visual food selection guide
- Shows proportions of 5 food groups recommended daily

Issues in Average Australian Diet

Too much alcohol, saturated fats, sodium, sugar

Not enough fibre, wholegrains, legumes, fruits, vegetables

ADG addresses this with:

- Serving size recommendations (age & gender-based)
- Advice on discretionary foods & activity
- No emphasis on specific foods

History of guides

History of Guides

1990s: Nutrition Australia pyramid (3 sections, vegetarian version)

1998 AGHE: Changed to pie chart, added fluids + 5 groups:

- Fruits
- Vegetables & legumes
- Milk, yoghurt, cheese
- Lean meats, fish, poultry, eggs
- Bread, cereals, pasta, rice

2013 AGHE: Applies to healthy Australians, focus on reducing chronic disease, emphasis on fresh, whole foods over supplements

International Guides

Japan: “Spinning top” food guide

USA 2015–2020:

- Eat: Variety of vegetables, fruits, grains (½ whole), fat-free/low-fat dairy, protein foods, oils
- Limits: Added sugar <10% energy, saturated fat <10% energy, sodium <2.3g, alcohol in moderation

Canada 2019:

- Applies to 2+ years
- Digital approach
- Focus: Food + where/when/why/how we eat
- Promote: Variety, mindfulness, enjoyment, cooking
- Research independent from industry

Evolution of Australian 5 Food Groups

1960s: 1. Fruit & veg 2. Grains 3. Meat 4. Dairy 5. Fats & oils

Today: 1. Vegetables & Legumes 2. Fruit 3. Grains 4. Lean meat, fish, poultry, eggs, legumes, nuts, tofu 5. Dairy & alternatives + allowance for fats & oils

Nutritional Models & Guides

- Have evolved with new research
- Confusion exists due to contradictory findings - examples:
 - ◆ Fat can be bad (cholesterol, weight gain) but healthy fats are beneficial
 - ◆ Meat is nutritious but excess may be carcinogenic
 - ◆ Soy benefits vs cancer risk debate
- Research funding may influence results
- Certainties: Fresh, unprocessed foods best; fruit & veg essential daily

Five Guidelines

1. **Healthy weight & activity:** Be active, choose nutritious foods/drinks to meet energy needs.