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**DETERMINANTS OF NUTRITIONAL REQUIREMENTS
OF SPINAL CORD INJURED ATHLETES**

Ingrid Perols

A thesis submitted in partial fulfilment of the requirements for the degree of

Master of Science
in
Nutritional Science

Massey University, Albany, New Zealand.

2000

ERRATUM

Throughout this thesis, and particularly in the abstract, results and discussion sections, where reference is made to the dietary intake data collected in this study it should be acknowledged that due to the lack of validity and reliability of the method of dietary data collection used (self-reported intakes in the form of a food diary) these are reported intakes and cannot be considered as actual intakes.

In the "Abstract", line 28 the unit for energy intake should be stated as kilojoules and not as incorrectly stated in kilocalories. The sentence should read: "The mean reported energy intake was 8678 ± 2411 kJ per day...".

Abstract

Disability sport is attracting more participants and is becoming increasingly competitive. Athletes with spinal cord injury (SCI) resulting in quadriplegia face a number of physiological limitations such as reduction in lean body mass, increased fat mass and altered physiological responses to exercise, as a direct consequence of their injury. Long-term health consequences of spinal cord injury such as cardiovascular disease, type 2 diabetes and osteoporosis occur earlier than in the able-bodied population.

The aims of this study was to investigate the nutritional status and some of the physiological characteristics likely to impact on the nutritional requirements of SCI athletes.

Sixteen wheelchair rugby players currently playing for a regional team in the 1999 NZ National Wheelchair Rugby Tournament were recruited. Subjects completed a brief demographic questionnaire to provide information about their injury, and 7-day food diary for assessment of dietary intake during the competition season. Body composition and bone mineral density were assessed by dual-energy x-ray absorptiometry (DEXA) and an arm-cranking test was performed in a laboratory situation to assess heart rate response and oxygen uptake during exercise. Finally, monitoring of heart rate in a game situation was performed on three subjects.

Body composition data showed that subjects had a body mass index (BMI) (26.4 g/cm²) similar to that of the general New Zealand population and to paraplegic subjects in New Zealand. However, lean body mass was low (60.1% of total body mass) and body fat was relatively high (34.9% of body

mass) in comparison to both the general population and to other athletes. Mean whole body bone mineral density for the group was within the normal range however, five subjects were classified as having osteopenia and of those, two were classified as having osteoporosis. The mean energy intake was 8678 ± 2411 kcal per day, significantly below that of NZ males in the same age groups [1]. The contribution from carbohydrate, protein and fat to total energy intake was virtually identical to that of the general NZ population [1]. Many of the subjects did not meet the Recommended Dietary Intake (RDI) for a number of micronutrients.

Heart rate (HR) response and oxygen uptake (VO_2) was similar to that found in other studies [2]. Interestingly, the relationship between HR and VO_2 showed a linear increase during the graded exercise test resulting in a coefficient of determination above 0.923 for all subjects.

Heart rate profiles were recorded for three subjects in a game situation and energy expenditure was calculated from VO_2 data from the laboratory exercise test. The three subjects had a calculated energy expenditure ranging from 3.7-7.2 kcal/minute of exercise.

It was concluded that BMI may not be an accurate method to assess obesity in quadriplegic subjects and body composition assessment by DEXA provides a more accurate method for determining changes in body composition and bone mineral density over time. It was further concluded that many subjects had low energy intakes resulting in suboptimal intakes of macronutrients. Many subjects would benefit from dietary advice with a view to improve general health and exercise performance. Heart rate monitoring for the

purpose of estimating energy expenditure should be investigated further in this population as should other factors likely to impact on both general health and exercise performance.

Table of Contents

1	Introduction	1
2	Literature Review	4
2.1	Wheelchair Rugby	4
2.1.1	The History of Wheelchair Rugby in New Zealand	4
2.1.2	The rules of the Game	4
2.2	Spinal Cord Injury	5
2.2.1	The Spinal Cord	6
2.3	Life and Health Expectancy After Spinal Cord Injury	8
2.4	Obesity, Cardiovascular Disease and Type 2 Diabetes	10
2.5	Osteoporosis	13
2.6	Physiological Consequences of Spinal Cord Injury	19
2.6.1	Cardiovascular System	20
2.6.2	Exercise Responses	21
2.6.3	Thermoregulation	25
2.7	Body Composition	26
2.8	Energy Expenditure During Rest and Exercise	31
2.8.1	Estimating Energy Expenditure by the Use of Heart Rate Monitoring	33
2.9	Exercise Testing	34
2.10	Current Nutrition Recommendations for Wheelchair Sport	36
2.10.1	Dietary Intake of Spinal Cord Injured Individuals	38
2.11	Assessment of Dietary Intake	39

3	Aims of the Study	41
4	Methodology	42
4.1	Dietary Assessment	42
4.2	Body Composition and Bone Mineral Density	43
4.3	Exercise Test	44
4.4	Heart Rate Monitoring in a Game Situation	46
5	Results	48
5.1	Demographic Data and Physical Characteristics	48
5.2	Body Composition and Bone Density	49
5.3	Dietary Intake	50
5.3.1	Energy and Macronutrient Intake	50
5.3.2	Micronutrient Intake	54
5.4	Exercise Test	55
5.5	Heart Rate Monitoring in a Game Situation	56
6	Discussion	58
6.1	Anthropometric Characteristics and Body Composition	59
6.2	Bone Mineral Density	62
6.3	Dietary Assessment	66
6.4	Exercise Testing	74
6.5	Heart Rate Monitoring in a Game Situation	76
6.6	Recommendations	78
6.7	Limitations	79
7	Conclusions	81
	References	85

Appendices

1	Invitation to Participate in a Research Study	96
2	Consent Form	97
3	Demographic Questionnaire	98
4	Food Diary	99
5	Technical Description of the DEXA Technique	100
6	Individual Bone Mineral Data	101
7	Sample DEXA Scan	102
8 A	Individual Subjects' Dietary Intake of Energy, Macronutrients and Alcohol (graph)	103
8 B	Individual Subjects' Dietary Intake of Energy, Macronutrients and Alcohol	104
9	Individual Heart Rate/Oxygen Uptake Graphs from the Exercise Test	105
10	Sample of a Heart Rate Recording from a Wheelchair Rugby Game	106

List of Tables

5.1 Demographic Data for Each Subject	48
5.2 Anthropometric Data for the Study Group	49
5.3 Data for Bone Mineral Density and t-scores for the Study Group	49
5.4 Daily Intake of Energy, Macronutrients, Alcohol and Fibre	51
5.5 Contribution of Different Fatty Acids to Total Energy Intake	53
5.6 Micronutrient Intake in Comparison to the Recommended Dietary Intake for New Zealanders	54
5.7 Oxygen Uptake, Heart Rate and Power Output for the Group	56

List of figures

2.1 The Spinal Cord and the Spinal Nerves	7
4.1 Set-up for the Exercise Test	45
5.1 Contribution of Carbohydrate, Protein, Fat and Alcohol to Total Energy Intake	51
5.2 Heart Rate and Oxygen Consumption Data for Two Subjects	56