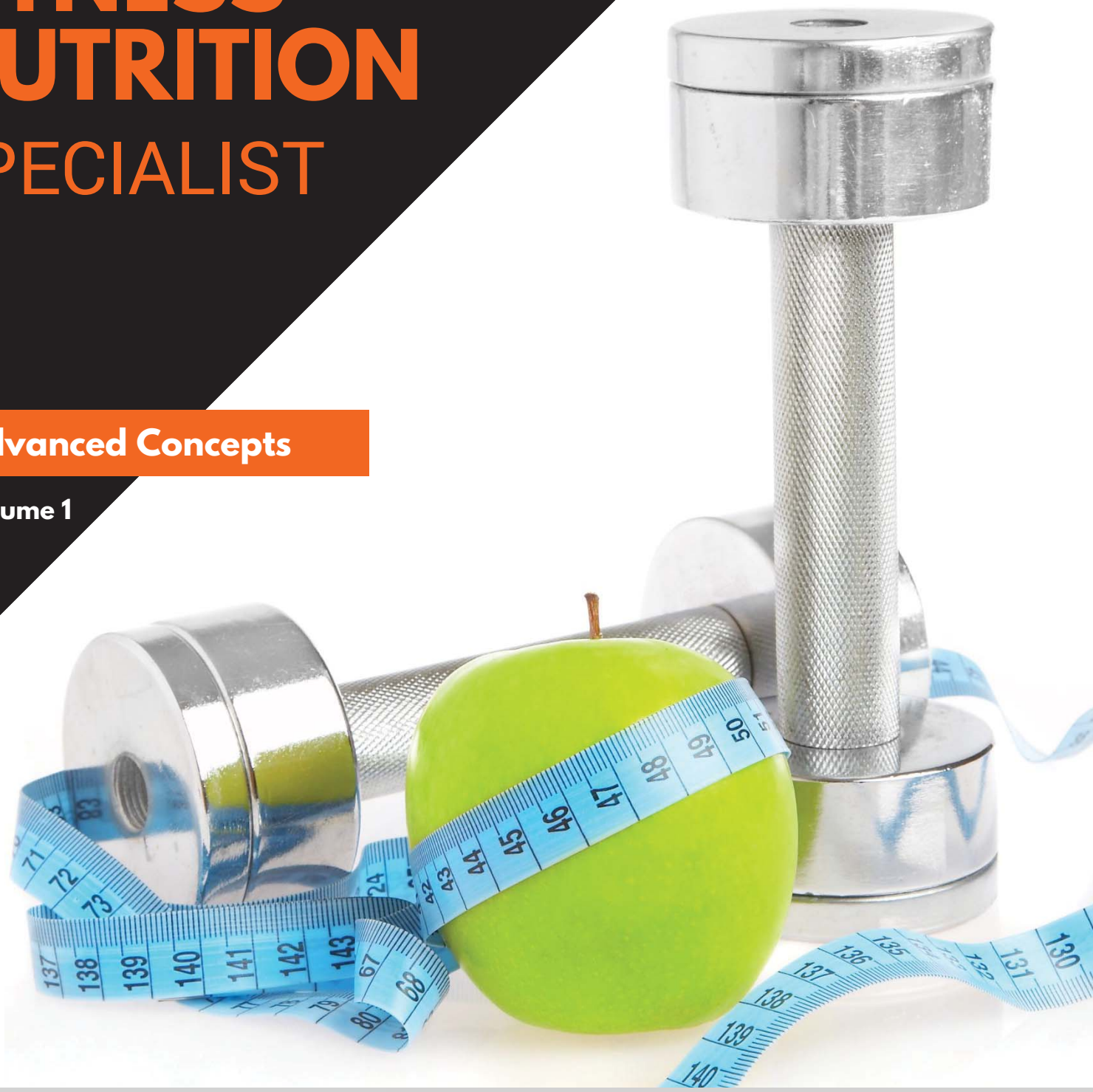
FITNESS NUTRITION SPECIALIST

Advanced Concepts

Volume 1



NFPT

Understanding Internal Chemical Processes, Energy Provision and Conversion, Nutrient Requirements and Synergy Between Food and Fitness

Fitness Nutrition Specialist

A nutrition resource for general fitness
and athletic training

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NFPT takes a unique physiological look at nutrition as it applies to fitness and athletics, when training the apparently healthy individual. This manual offers insight regarding energy provision from the time foods enter into the digestive process to when they are delivered to body cells, and most importantly how it all relates to fitness and athletics. Our goal with this content is to comprehensively address complicated body functions relating to physiological processes and "nutrient metabolism", as it is affected by all forms of exercise, and its impact on issues ranging from general health to advanced sports performance.

NOTE – this manual is associated to the NFPT Fitness Nutrition Specialist course, which is a continuing education course for your personal trainer skill set development. You will be able to provide insight relating to the interrelationships between physiology and nutrition relative to fitness, exercise, and athletic performance among apparently healthy individuals. A Registered Dietitian (RD) is the appropriate health care professional to be consulted for the planning and managing of a specialized diet to other than healthy individuals. Moreover, a RD provides nutritional care relating to the effects of disease on nutrient metabolism using diet therapy, nutritional assessments, and clinical nutrition counseling. This course does not extend your scope of practice to that of a RD. Always perform proper screening and seek the involvement of the appropriate health care professional when applicable.

Introduction

Approach to Dietary Recommendations

Teaching healthy dietary practices can be viewed from two completely separate perspectives. One perspective is to educate from the outside, or to provide for a distinction between nutritious wholesome foods and junk foods; identifying carbohydrate, protein, and fat sources, and offering consumer advice regarding food labeling. The other perspective is from the inside, or a physiological perspective, that includes an education on what the body does with different foods once ingested, as well as the foods' positive & negative effects on physical health and well being. Understanding both perspectives is important. However, since education from the "outside" perspective is so widely practiced and made so readily available, we will focus less on the "outside" than on the "inside". We'll begin our studies by discussing the body's internal nutrient provision & utilization systems. The following will reflect a variety of little known facts and functions that occur inside the body relative to educating clients in the area of enhancing positive lifelong dietary habits, as well as ways to prevent the negative effects of poor eating habits.

After establishing what bodily functions occur, then we look at the following:

- the purposes that these nutrients serve once present in the bloodstream
- the positive and negative effects of high and low levels of each
- enhancing the positives while minimizing the negatives, through dietary control

3,500 – The Simple Math

Why should the number '3,500 ' always stand out in your mind? Because this number has everything to do with the prescription of an overall fitness program as it centers around the total caloric intake. It has long been accepted that 3,500 calories equates to a pound of body weight, in the metabolically average, healthy individual, with select few exceptions. Though we will use the number 3,500 to simplify the means, as it is a generally accepted standard, we do recognize that there are variances in the number, recognized by professionals within the health and fitness community, which do not hold to a solid 3,500 figure. For our purposes, however, we will conduct our equations with this figure in mind as it is a traditionally set and standard figure (for most cases). Despite the perhaps miniscule differences in traditional figures, one thing is for sure - even fitness can be viewed as a mathematical equation.

In a perfect world, you would first prefer to have the diagnostic capability to determine RMR (Resting Metabolic Rate). The term RMR is somewhat similar to the term BMR (Basal Metabolic Rate), both provide estimates for how many calories you would burn if you did nothing but rest for a 24 hour period - so, this would be the minimum number of calories that your body needs to perform its basic daily functions, while at rest. A BMR test is more specifically calculated, after 8 hours of sleep and 12 hours of fasting; whereas the RMR test does not require specific conditions for sleep and fasting. The terms RMR and BMR are often used interchangeably; for our purpose we will use the RMR estimate. Though your clients' RMRs will vary, you can make a general assumption that those who have difficulty losing weight will have a low RMR, and those finding it difficult to gain weight will have a high RMR. It is also generally understood that, as your age increases, your RMR decreases - which is why, as we grow older, it is increasingly necessary to eat less, and/or

better, and exercise more in order to maintain a current weight.

Prolonged, extremely low calorie dieting will slow the metabolism even more and would be reflected in a follow-up RMR, taken sometime after a restricted caloric intake had been maintained. For this reason, especially among those with already low RMRs, it is important to keep caloric consumption at, or above, RMR requirements; otherwise, these already low RMR dieters may be positioning themselves for an even greater fat accumulation due to an even slower metabolism. It is also just as important to maintain RMR minimum intake among those with already high RMRs in order to prevent an undesirable starvation loss of body (muscle) tissue.

Individuals with low RMRs typically expend fewer calories during both daily activity and the performance of exercise than do those with high RMRs who are performing the same work - keep this in mind when considering total daily activity expenditures. We will look at RMR calculations further into our studies; for now, let's get back to that number, '3,500'.

The least productive method used for fat loss is unfortunately the most commonly used...dieting! First of all, most people don't know how to 'diet', or they think that 'diet' means severely depriving the body of food. 'Diet' should be the day to day way that we eat, a health conscience way, but instead it is associated with quick methods for getting thin. Keep in mind, when someone diets, especially when there is a drastic change in the way the person normally eats, there is always the opportunity for the body to cannibalize muscles and not draw from its fat reserves - hence, doing exactly the opposite of what is intended. This is unavoidable and can only be offset in degrees, through the performance of resistance exercise. Even during the most moderate dieting, without the performance of resistance exercise, the body views fat reserves as being more valuable than lean muscle and therefore hordes it as a starvation fuel source; it will use sedentary muscles for energy instead. Conversely, through regular resistance exercise, during proper dieting, the body must continually adapt by preserving and even building of otherwise useless muscle tissue in an effort to keep up with your imposed strength demands. This forces a greater degree of fat loss on a low calorie diet and the preservation of metabolically active muscle tissue, which keeps the metabolic rate high.

Where do you draw the line when dieting? This is where '3,500' comes in. It is generally accepted that the optimum fat loss rate is achieved by consuming 500 calories/day less than the need for weight maintenance, which requires finding RMR + daily activity + exercise expenditure. The idea is, at this 500 calories/day decrease, you should lose body weight at a rate of 1 pound per week (7 x 500 = 3,500). A diet any lower in daily caloric intake may result in unacceptable lean tissue loss. Conversely, those wishing to gain weight should also use the number 3,500 to regulate their weight gain. When gaining weight (using resistance training in the process to optimize lean weight increase and minimize fat increase) keep additional calories at approximately 500/day over the need for weight maintenance intake, found again by using RMR + daily activity + exercise expenditure. Generally, these additional 3,500 calories (500 calories/day increase x 7 days per week) will result in weight gain at a rate of 1 pound per week.

Both fat loss and weight gain diets that are too extreme end up being counter-productive, resulting in either too much muscle loss during weight loss dieting, or too

much fat increase during weight gain dieting. Never, under any circumstances, prescribe a diet that is less than is required for RMR needs.

Calculating RMR

There are several ways to determine a person's RMR. NFPT independent research provides for a simplified formula that is a derived average of several traditional equations for finding RMR, it is 11 x LBW (Lean Body Weight). LBW, also known as LBM for lean body mass, has to be determined before this simple estimation equation can be used. LBW can be found using an approved body fat testing procedure and device, such as skin fold testing. Follow the instructions provided with the approved device, which will calculate the body fat %, and use the formula:

LBW = Body Weight, in lbs - (Body Weight, in lbs x Body Fat %)

RMR = 11 x LBW

Another way to find LBW is to use the Hume formula, an industry standard equation for estimating LBW in adults. Many online calculators are available for this and other formulas which will provide quick and accurate results (however, it is beneficial to understand the method/formula that is used to find the resulting figure; not for memorization purposes, but for a personal understanding and benefit of knowledge). The Hume formula states:

For Men: LBW = (0.32810 x weight, in kg) + (0.33929 x height, in cm) - 29.5336

For Women: LBW = (0.29569 x weight, in kg) + (0.41813 x height, in cm) - 43.2933

NOTE: 1 pound (lb) = .453592 kilograms (kg)
1 inch (in) = 2.54 centimeters (cm)

Once you find LBW, you can then solve for a general estimate of RMR by using NFPT's simplified 11 x LBW equation. But, it is important to know that there are many ways and a number of different formulas for calculating RMR. Some approaches to calculating RMR are more exact than others, or more relevant, because some of the equations factor in the current physical condition of the individual and their activity level. However, keep in mind that standard industry equations often offer only general estimates; though accurate in their scope and effective as a general place to work from, they are based on averages and can only 'predict' accurate figures based on those averages. Equations that offer the closest measurements for RMR will factor in the components: gender, age, height, weight, muscle mass and activity level. Understand that there are many contributing factors to your RMR, things like environment (i.e. altitude and weather), crash diets and supplementation, genetics and physiological changes (i.e. pregnancy) - these can all have an effect on RMR. According to the American Dietetic Associations (ADA), the Mifflin St-Jeor equation for determining RMR is the most accurate. It states:

For Men: RMR = (10 x weight, in kg) + (6.25 x height, in cm) - (5 x age, years) + 5

For Women: RMR = (10 x weight, in kg) + (6.25 x height, in cm) - (5 x age, years) - 161

If you want to get even more accurate, after finding this RMR estimate, factor in an

activity level component to the resulting RMR. Choose an applicable factor for your client from the Activity Description/Factor Chart to follow.

ACTIVITY DESCRIPTION	ACTIVITY FACTOR
Sedentary: little or no exercise	1.2
Lightly Active: light exercise/sports 1-3 days/week	1.375
Moderately Active: moderate exercise/sports 3-5 days/week	1.55
Very Active: hard exercise/sports 6-7 days/week	1.725
Extremely Active: hard daily exercise/sports w/physical job demands	1.9

After you have determined the activity level factor, multiply this number by the RMR estimate, this gives you an even closer RMR that includes the activity level component.

Let's work out the math in an example using a 40 year old male client who weighs 175 lbs and is 6' tall. He exercises a couple of days per week and has a desk job. Find his RMR.

First, convert the weight and height measurements into kilograms (kg) and centimeters (cm). So, 175 x .453592 = 79.3786 kg ; and since 6' is a total of 72 inches we can find that in centimeters with 72 x 2.54 = 182.88 cm. Now, we plug these numbers into the formula (for your male client):

For Men: RMR = (10 x 79.3786) + (6.25 x 182.88) - (5 x 40) + 5 =

793.786 + 1,143 - 200 +5 =

1,741.786 = **RMR**

For an even closer RMR estimate, factor in his activity level, which you should determine to be "light activity", given his approximate 2 day a week exercise and regular desk job, as a factor of 1.375. Therefore, 1,741.786 x 1.375 = 2,394.95575

Rounded to nearest whole number, this client's RMR is 2,395 calories on a daily basis. He would need to take in at least this many calories to maintain his weight.

Now, let's use the simplified NFPT equation of 11 x LBW to find the RMR estimate on this same client - to see how closely they compare. First, find LBW, using this equation:
For Men: LBM = (0.32810 x weight, in kg) + (0.33929 x height, in cm) - 29.5336

Plug in his height (cm) and weight (kg)
(0.32810 x 79.3786) + (0.+33929 x 182.88) - 29.5336 =
26.0441187 + 62.0493552 - 29.5336 =
58.56 = LBW *(so, your male client has a lean body weight of 58.56 kg)*

Convert to pounds (lbs) by dividing the number of kg's, 58.56, by the number of kg's in one (1) lb: 58.56 ÷ .453592 = 129 lbs

Therefore, this male client's lean body mass is 129 pounds.
Using the 11 x LBW, NFPT simplified equation, take 11 x 129 to find an estimated RMR.
RMR = 11 x 129 = 1,419 calories

There is an approximate 300 calorie difference between this figure and that of the resulting Mifflin-St Jeor equation - keep in mind however that there are many formulas for estimating RMR, and very rarely will their RMR results be the same; in fact, most come with disclaimers of variance errors, as does NFPTs simplified version. An exact RMR is not within the scope of this NFPT study as it would require a more extensive understanding of the variances within the factors of the many equations, devices and protocols for calculating a more exact figure. Daily energy expenditure, for example, is a major contributor to the RMR estimate - the closer you can come to exacting this expenditure, the closer your RMR estimate will be to exact, for example. But, for our purposes, an estimated RMR works.

The healthiest, but often times the most difficult, way to lose fat is to exercise. If one could perform activity with a caloric expenditure of 500/day, they would lose weight at a rate of 1 pound per week. With this in mind, where weight maintenance is concerned, an increased expenditure of 500 calories/day through exercise amounts to the same as reducing calories at a rate of 500/day. Conversely, a reduction of activity expenditure in the amount of 500 calories/day amounts to the same as a 500 calorie/day increase in calories. Once again, this is the ideal weight loss rate. Keep in mind that, when exercising for fat loss, intense aerobic activity causes lean tissue loss. Resistance exercise needs to be performed during fat loss dieting to minimize the lean weight loss.

For the weight gain client, it is not recommended that they perform a significant amount of aerobic activity opting of course to perform heavy resistance training to optimize lean weight increase. Unlike the fat loss client, the best method of weight gain is to increase calories, taking care to perform resistance exercise at moderate to high intensity to ensure against undesirable fat accumulation.

Combining proper caloric intake with the right exercise program is the preferred method of achieving any weight maintenance, fat loss or weight gain goal. Understand that if the client is exercising and dieting then each of these two variables need to be considered. For example, if a fat loss client is expending 300 calories/day during exercise, the daily caloric intake need only be reduced by 200 calories. If the weight gain client is expending 300 calories/day during exercise, the diet needs to be increased by 800 calories offsetting this expenditure to arrive at the desirable 500 calorie/day increase.

General Nutrition

Strictly following a proper diet can at times be extremely difficult, if not impossible. It takes practice! It may take up to a year to completely change current bad eating habits into good ones. Suggest to your client that they work on their diet one meal at a time. Work on the first meal for a period of a week, two weeks, or as long as it takes to make this particular meal healthy, then move on to the next.

NEVER associate the word diet with starvation! This is one of the worst things a person can do to themselves, both physically and mentally.

Physically, when the body senses starvation it will go into a survival mode. It will conserve body fat, and will instead opt to use amino acids, blood proteins, and muscle & organ tissue as primary sources of energy.

Mentally, starvation takes its toll on the will. There is a much more likely chance that a 'break down' of will occurs when starving oneself, which generally manifests into a feast on junk food that is later perceived as a personal failure.

Starvation as a means of fat loss should be practiced only by a qualified physician for the treatment of ***severe*** cases of obesity.

As the client learns more about their diet, they may be surprised at their required number of calories. Not everyone has the same caloric needs. Stick to a consistent number of calories, monitor body fat percentage, and when this percentage levels off, you will then know exactly what the participant's caloric needs are. This will then allow you to make adjustments to their diet for weight loss or weight gain. And always remember, one gram of fat is more than double the number of calories found in one gram of protein or carbohydrates.