

## Managing Sarcopenic Obesity: New Trends to Combat Dual Task of Muscle Loss and Fat Increment

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### Abstract

The challenge, we face now, is hard as we are observing new emerging trends of increasing obesity, shrinking muscle mass and strength as age progresses. The term defining this new challenge is "Sarcopenic Obesity" (SO) which is sarcopenia (muscle loss) and obesity (increasing fat content). To reverse this dual impact, physical exercise and moderation of diet is important. In our case study, we achieved this balance by negative change in the fat mass by 14% and a positive change in muscle mass by 4%. The change in body weight was about negative 2%. A regular exercise schedule focused on increment of muscle mass and increment in the dietary protein intake was the key to achieve this. Not only was it able to improve muscle mass but also muscle strength and aerobic capacity of subject.

**Keywords:** *Sarcopenic Obesity; Muscle Loss; Fat Mass; Protein Intake; Aerobic Capacity*

### Introduction

There is an increment in population of elderly in our society. The population of elderly will almost double from 12% in 2012 to 22% by the year 2050 [1]. With this increment in ageing population, highest prevalence of obesity is also reported in people over 60 years [2]. Muscle strength loss is also pronounced over the age of 80, where the proportion of weak muscle strength is highest [3]. This leads to increment of risk of this population to develop certain lifestyle diseases like diabetes. The prevalence of diabetes is highest in the age group of 65-79 in males and females [4].

Our study started with such an individual who was over 50 years of age when he first came to meet us with a specific and peculiar request. Dr Unni Karnakara, the international president of MSF (Medicine sans frontiers), was retiring in October 2013 and wanted to do a cycling trip covering the entire country of India on cycle, generating awareness and funds for projects of MSF in India.

This was a long and hard trip of nearly 6000 kilometer in all the possible terrains like high altitude, deserts, near ocean and all the possible weather conditions like cold, hot, humid and all the intermediaries. We started with taking the baseline of physical fitness and body compositing for Dr Unni. Once we had the results, the problem was clear; he had excess of fat (28%) and muscle mass which needed improvement. We put him on an exercise regime and a proper diet to follow up for 2 months before the cycling tour began in November 2013. He followed the protocol precisely and despite his busy schedule in last few days of his presidency, always kept up with the numbers given to him.

Exercise regime initially focused on hypertrophy and overload of the muscles involved in the activity, which were the lower girdle, shoulders, triceps and core muscles. Strength training involved 4 sessions per week of circuit training, focused on overload and hypertrophy. The diet followed was high in proteins for building muscles (1.3 - 1.8 gms/kg body weight).

Before the start, we repeated the initial test battery to see the effectiveness of the plan and if we needed to tweak anything for his tour. We observed a great improvement in his muscle compartment and since we did not want to lose too much fat, as it will provide the fuel for trip, everything was on correct track.

Since the beginning of cycling tour, the change in exercise regime was to concentrate on recovery and no overload exercises for building muscles. He did follow a maintenance exercise schedule of 2 sessions per week, so that the muscle compartment does not drop too much during long duration endurance event. The diet changed from high protein muscle building diet to moderate protein high energy diet during the tour, so as to give fuel for cycling and to replenish proteins in the system.

**Materials and Methods**

**Sampling**

This was a case study performed on Dr Unni Karnakara for his cycling tour on India, where he covered a distance of nearly 6000 kilometers in about 2 months.

**Measurements**

Body composition was done on Tanita segmental body composition system. Aerobic capacity was calculated on Monark exercise bike and polar heart rate system.

**Data Analysis**

Data collection was done by Microsoft Excel and statistical analysis was also done on the same.

**Ethical Considerations**

The participant signed informed consent form before we started the study. No ethical approval required in India for such case studies. All study protocols were conformed to the Declaration of Helsinki.

**Results and Discussions**

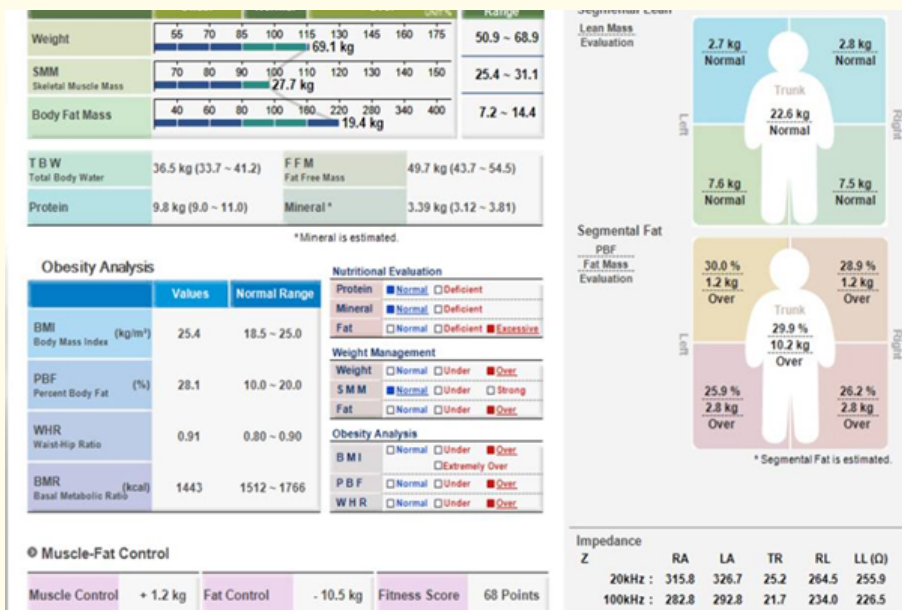


Figure 1: Base line segmental body composition for Dr Unni.

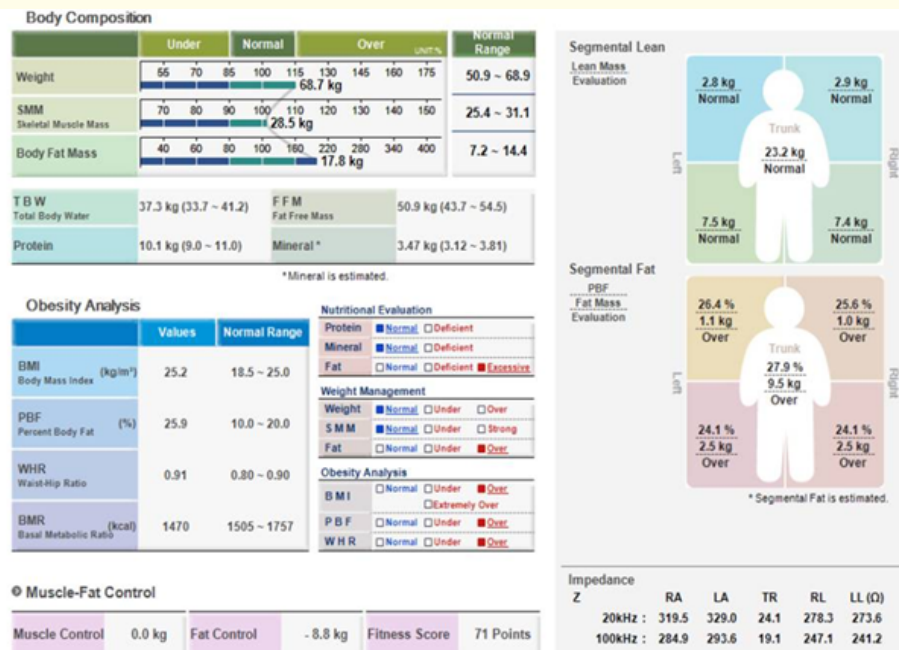


Figure 2: Segmental body composition at the beginning of cycling tour.

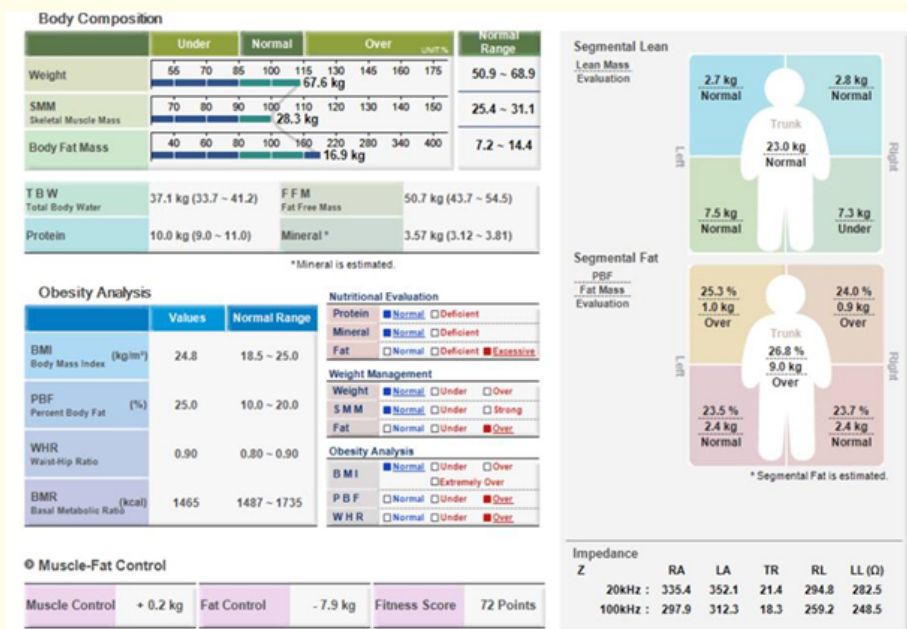


Figure 3: Final segmental body composition at finish of cycling tour.

Parameter	07/31/2013 (Initially)	10/9/2013 (At starting of cycling tour)	01/02/2014 (Finally)
Body Weight	69.1 kgs	68.7 kgs	67.6 kgs
SMM	27.7 kgs	28.5 kgs	28.3 kgs
BFM	19.4 kgs	17.8 kgs	16.9 kgs
TBW	36.5 kgs	37.3 kgs	37.1 kgs
VO <sub>2</sub> Max	1.53 ml/kg/min	40.76 ml/kg/min	50.65 ml/kg/min

**Table 1:** Comparison Table.

The initial evaluation revealed the areas we needed to work, the fat percentage was high and muscle mass was on the lower side. The challenge is same in elderly age group with the increasing trend of SO. The plan for first phase of training was to increase muscles as much as we could as that will help to increase performance, as our cycling tour was long and strenuous; we focused not to lose much of the fat initially. Once the tour started, the focus shifted to maintain the muscle mass and burn as much as we could. The change in diet was from a high protein diet in initial phase (1.5 - 1.8 gms/kg body weight) to moderate protein diet for recovery (1 - 1.3 gms/kg body wt).

For reduction of body weight and fat in particular, the calorific exchange is very important. To lose a pound we need to burn about 3500 calories, since our focus was not much on the weight loss, we kept the needs met through calorific intake on regular basis. Once strength training and long duration aerobic exercises were started, the body started to remodel itself. The change was positive in the direction we wanted, which is muscle increment and reduction in fat percentage. Specific and regulated programs are effective in reversal of age related changes of muscle loss and fat increments in elderly [5].

**Conclusion**

The effective way to combat the dual challenge of SO is to work towards reducing weight overall and at the same time focus on increasing the muscle mass. The hardest thing to do is to take that initiative of making a change. It was hard for Dr. Unni too, but the belief in himself and the cause that he was fulfilling with this tour gave him the initial strength to decide and then execute the entire tour. Regular exercise which is focused on strength training, aerobic exercises and a diet that promotes muscle building can reverse the effects of SO in the long run too.

**Conflict of Interest**

The authors declare that there is no conflict of interests concerning the publication of this paper.

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