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Case Report

Never too Late to Reduce Weight with Chronotype Tailored Diet & Adjuvant Therapy for Obesity & Metabolic Health

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Abstract

Meal timing and the type of diet are crucial factors influencing metabolic health and obesity. Misaligned meal timing, particularly late-night eating, and diets high in processed foods and sugars can disrupt circadian rhythms, negatively impact metabolism and increase the likelihood of weight gain and related health issues. Circadian Rhythm or the body's internal clock, regulates various bodily functions, including metabolism. Meal timing that aligns with this rhythm can optimize metabolic processes. Consistent meal timings, during daylight hours, cultivated better insulin response to regulate blood sugar levels, help regulate appetite hormones that in turn prevent overeating and influence metabolic flexibility. If Metabolic health is disturbed due to a cluster of conditions including abdominal obesity, high blood pressure, impaired fasting glucose, high triglyceride levels, and low HDL cholesterol level and MASLD is found to be affecting approximately 25% of the population in India. Metabolic disorders disrupt normal metabolism, which is the complex set of chemical reactions that maintain life and enable growth, repair, and reproduction. This constellation is triggered by insulin resistance and its resultant hyperinsulinemia. The two most important and universally agreed causes of insulin resistance are increased body fat (particularly central obesity) and physical inactivity. Materials and Methods: This article is an outcome of application of Chronotype Tailored Diet & Adjuvant integrated Therapy on a case Obesity, MASLD, Rheumatoid Arthritis complimented by the author with relevant literature review. Outcome: Initial Inflammation Reduction using allopathic medications which reduced joints pain motivating her for regular exercises, ii) The Diet treatment plan was tailored based on Chronotype to the patient's specific needs and medical history which heled to reduce weight, iii) Combining Allopathy, Ayurvedic Panchakarma with yoga and Meditation therapy proved to be effective in physical and mental wellbeing and iv) Dietary changes and stress management played a crucial role in the patient's recovery.

Kew Words: metabolic syndrome; a chronotype-adapted diet; adjuvant therapy

Abbreviations

Circadian Rhythm; insulin response Central Obesity**; RA=** Rheumatoid Arthritis**; MASLD=** Metabolic dysfunction-associated steatotic liver disease**;**

Introduction

Most middle- and high-income people gain or have persistent overweight & Obesity which is associated with a high risk of chronic diseases beyond type 2 diabetes and increased all-cause mortality. The great relief from recent studies is that people who reduce excess weight in midlife can roughly halve their risk of developing chronic disease later in life, reaffirming the importance of lifestyle in achieving & maintaining a healthy weight through physical activity & prioritizing nutrient-rich foods which improve metabolic function, potentially leading to weight management and reduced risk of obesity-related diseases. Insulin inhibits fat breakdown, so it contributes to weight gain [1]. Meal timing and the type of diet are crucial factors influencing metabolic health and obesity. Misaligned meal timing, particularly late-night eating, and diets high in processed foods and sugars can disrupt circadian rhythms, negatively impact metabolism and increase the likelihood of weight gain and related health issues. Conversely consuming meals at regular, daylight hours help reduce weight gain or even lose weight. Metabolic Syndrome is a clustering of specific risk factors, namely, central obesity, raised blood pressure, impaired fasting glucose, raised triglycerides, low levels of high-density lipoprotein -cholesterol (HDL-C) & Metabolic dysfunction-associated steatotic liver disease MASLD. This constellation is triggered by insulin resistance and its resultant hyperinsulinemia [2].

Circadian Rhythm or the body's internal clock, regulates various bodily functions, including metabolism. Meal timing that aligns with this rhythm can optimize metabolic processes. If meals are consumed at regular times, particularly during daylight hours, the body's insulin response is more efficient, helping to regulate blood sugar levels. Consistent meal timing also helps regulate appetite hormones, potentially leading to better control over food intake and prevent overeating. Meal timing also influences metabolic flexibility, which is the body's ability to switch between using carbohydrates

and fats for energy [3]. On the other hand, eating at irregular times, especially late at night, disrupts the circadian rhythm and negatively impact metabolism leading to i) Increased fat storage contributing to weight gain and obesity ii) decreases insulin sensitivity, potentially increasing the risk of type 2 diabetes iii) disrupts circadian rhythms and appetite hormones, leading to increased hunger and overeating. A chronotype-adapted diet involves adjusting eating schedule & macronutrient distribution to align with our body's natural sleep-wake cycle, to optimize metabolic processes by timing meals to coincide with individual peak periods of wakefulness & activity. A chronotype-adapted diet, therefore, is more effective than a standard low-calorie diet in improving body composition, metabolic health, and gut microbiota in overweight or obese individuals, especially among evening chronotypes who face greater challenges with conventional dietary strategies.

This article is based on a case recently managed by the author applying Chronotype Tailored Diet & Adjuvant Therapy for Obesity, MASLD, Rheumatoid Arthritis complimented with relevant literature review.

Case report:

54 years old, Female, IT Software consultant at a senior level, working with an international agency, demanding working from early evening to midnight, presented with history of severe multiple joint pains, difficulty in walking, Fatigue, and breathlessness on exertion especially climbing even 10 steps and disrupted sleep for the past 9 months. History revealed that she had Irregular food habits and timings, leading to digestive issues. Physical examination revealed a short, stout, fair lady with more central obesity. Her height was 55 inches; weight = 70 kg and abdominal girth was 38 inches. The thyroid gland was enlarged and on inquiry she reported that it had been there for 5 years. Clinical examination of CVS was normal but Respiratory systems on auscultation revealed mild wheezing- a high-pitched whistling sound, during exhalation.

Her Anthropometry and BMI worked out using the formula:

1. **BMI** = (weight (kg) / (height (cm) * height (cm) X10000. = 70/140 x140x1000

   = 70/19600x1000

   =70/1.96= 35.7

Underweight: <18.5, Normal: 18.5 - 24.9, Overweight: 25 - 29.9, Obese: 30 or higher

2. Waist Circumference= 96.5 CMS {for women, 88 cm (35 inches) or more is considered an indicator of central obesity}
3. Waiste/Height Ratio = 96.5/140= 0.69. A Wt./HR ratio of 0.5 or less is healthy, while a value of 0.5 or higher indicates increased risk.

Investigations: Blood for Thyroid hormones & RA factors, Chest X ray, and Abdominal CT scan

Based on clinical examination, and investigations she was diagnosed as a Case of **"Hypothyroidism, asthma, arthritis and early MASLD"**

Management:

1. The patient was guided by Chronotype tailored healthy food choices, regularizing food timings, & stress management.
2. Diet: Her chronotype analysis put her in Evening types (owls) as she used to be most alert and active in the evening and preferred to wake and sleep late. Chronotypes are our body's natural inclination towards a specific sleep-wake pattern. She was prescribed
   Smaller breakfast, lunch and a larger dinner, considering her needs. An evening type, like her, find it beneficial to have a larger meal later in the day or evening. As our body's natural 24-hour cycle influences various bodily functions, including metabolism. By eating in sync with our circadian rhythm, we improve digestion, nutrient absorption, and overall metabolic health.
3. Ayurveda: The patient underwent a Panchakarma treatment, a detoxification and rejuvenation therapy in Ayurveda and Yoga and daily half an hour guided meditation therapy too was integrated with the Panchakarma treatment.
4. Allopathy: she was put on Ibuprofen 400 mg thrice daily for 1 week and then tapered with twice a day and 1 tablet a day for another week.

Outcomes:

Reduction in Waist Circumference: The patient showed a significant reduction in waist circumference from 96.5 cms to 85 cms, indicating a decrease in central obesity over a period of 6 months. Improved Physical Health: She experienced relief from joint pain, improved breathing, and increased mobility by the end of 4 weeks, that motivated her for more exercises thereafter. Enhanced Mental Well-being: The patient reported reduced stress levels and improved sleep patterns after about 6 weeks Overall Improvement: The integrated approach of Ayurveda, meditation and yoga, along with initial anti-inflammatory drugs, lifestyle counseling, resulted in a positive impact on the patient's overall health and well-being. MASLD: Due to the changed dietary modification, a CT scan after 3 months had shown arrest of MASLD and by six months it was reversed near 80%.

Key Factors for this case's Success:

1. Initial Inflammation Reduction allopathic medications reduced pain motivating her for regular exercises
2. Individualized Dietary Treatment Plan: The Diet treatment plan was tailored based on Chronotype to the patient's specific needs and medical history.
3. Integrating Allopathy, Ayurvedic Panchakarma with Yoga & Meditation therapy proved to be effective.
4. Lifestyle Modifications: Dietary changes and stress management played a crucial role in the patient's recovery.

This case report highlights the potential of integrated therapies, including Ayurveda, Meditation and yoga, in managing central obesity and improving overall health in individuals, particularly in the Indian context.

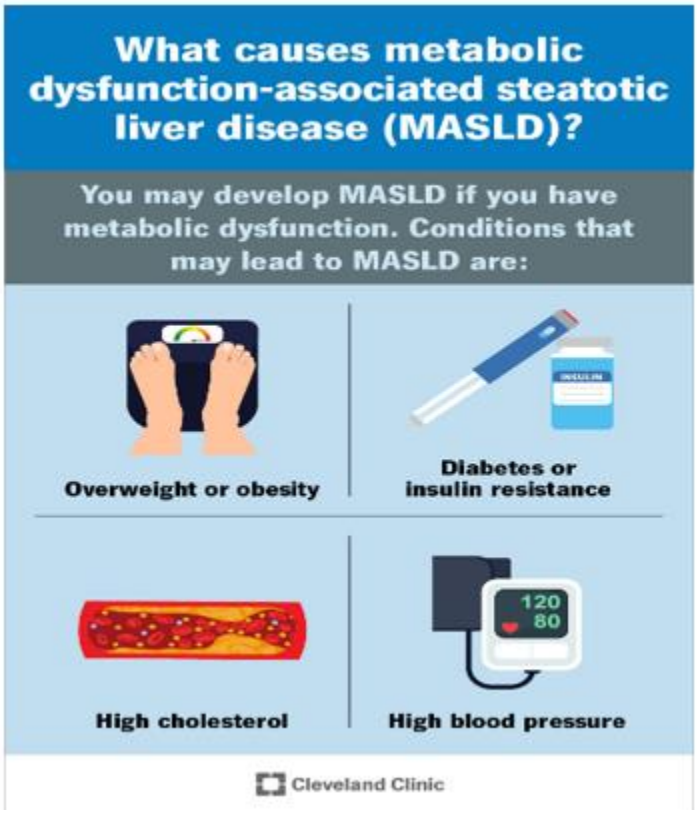
Discussions:

Obesity and its associated health complications have become a global public health concern, necessitating innovative approaches to weight management. Although the negative effects of obesity on health are well known, a few old studies have demonstrated long-term health benefits among individuals with sustained weight loss beyond its association with decreased diabetes risk and beyond heart attacks like heart attack, stroke, cancer, asthma, chronic obstructive pulmonary disease, and overall mortality. One such publication demonstrated that people have a large degree of control over their own health and can protect themselves from many illnesses including age-related diseases just by reducing excess weight in midlife achieved without weight-loss injections or surgical interventions [1]. One emerging area of research focuses on the influence of chronotype, an individual's preferred timing for daily activities, on eating habits, weight regulation, and metabolic health. Recent observational studies suggest that the misalignment between an individual's chronotype and external cues, such as meal timing, do contribute to metabolic dysregulation and obesity, though the evidence from intervention studies is still limited [4].

Metabolic dysfunction-associated steatotic liver disease (MASLD) is a group of liver diseases that happen when your body stores lots of fat in the liver causing {steatotic/fatty) liver disease (SLD). Over time, this fat in the liver causes inflammation in the liver. Until recently, it was known as nonalcoholic fatty liver disease (NAFLD.) In early stages this condition is reversible by dietary changes and physical exercises [6].

The human body's natural 24-hour cycle influences various bodily functions, including metabolism. By eating in sync with the circadian rhythm, we

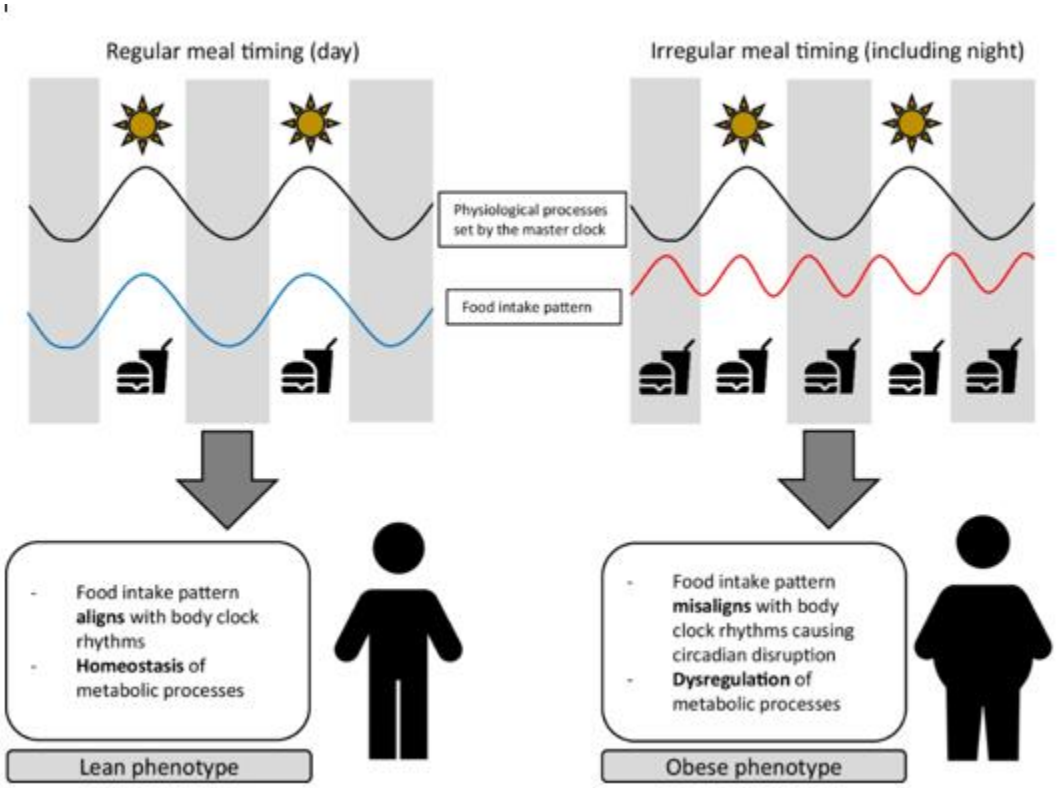
improve digestion, nutrient absorption, and overall metabolic health. Aligning meals with an individual's circadian rhythm is more beneficial than a routine three helpings a day. In essence, a chronotype-adapted diet is a personalized approach to eating that recognizes the importance of aligning our mealtimes with our body's natural rhythms to potentially optimize health and well-being [3,4].



A chronotype-adapted diet involves adjusting eating schedule & macronutrient distribution to align with our body's natural sleep-wake cycle. This approach aims to optimize metabolic processes by timing meals to coincide with our peak periods of wakefulness & activity. Chronotypes are our body's natural inclination towards a specific sleep-wake pattern. There are generally three main chronotypes: i) Morning types (larks): Tend to be most alert and active in the morning and prefer to wake and sleep early ii) Evening types (owls): Tend to be most alert and active in the evening and prefer to wake and sleep late iii) Intermediate types: Fall somewhere between morning and evening types. A chronotype-adapted diet suggests that one must eat most of calories when our metabolism is most active i.e., For morning types, must have a larger breakfast and lunch, with a smaller dinner. For evening types, a larger dinner or later meals is beneficial. By aligning meal timing with your body's natural rhythms, we experience more effective weight loss, gain or maintenance. This approach helps regulate blood sugar levels, improve insulin sensitivity, and optimize lipid profiles. Eating in sync with our circadian rhythm indirectly improves sleep patterns and positively impacts our gut microbiome [3].

A recent of total of 150 overweight and obese females and males aged between 18 and 65 years with a body mass index (BMI) ≥ 25 kg/m2, excluding individuals with Cancer, kidney or liver disease, inflammatory bowel disease, cognitive decline, and psychiatric disease, and drug therapies interfering dietary interventions. The primary outcome observed was weight change from baseline. Secondary outcomes are (1) body mass index (BMI) and fat mass change from baseline; (2) lipid and glycemic profile change from baseline (total cholesterol, LDL-cholesterol, HDL-cholesterol, triglycerides, fasting glucose); and (3) fecal microbiota profile and short-chain fatty acids (SCFAs) change from baseline. The results showed that a chronotype-adapted diet is a personalized approach to eating that recognizes the importance of aligning our mealtimes with our body's natural rhythms to potentially optimize health and well-being [2].

In another recent study researchers conducted a retrospective study to identify clinical factors that predict successful and sustained weight loss in 897 patients with MASLD (mean age, 61.6 years; 57.1% men; mean BMI, 30.3). Cases were referred between January 2019 and December 2021, with follow-up occurring between 18 and 24 months at four Italian tertiary centers. The diagnosis of MASLD was confirmed if patients had hepatic steatosis on ultrasound and at least one cardiometabolic risk factor, such as a BMI ≥ 25 or high waist circumference, fasting glucose levels ≥ 100 mg/dL or type 2 diabetes, blood pressure ≥ 130/85 mm Hg, triglyceride levels ≥ 150 mg/dL, or low levels of high-density lipoprotein cholesterol. The takeaway from the study include; i) Over a median duration of 21 months, 18.3% of patients achieved at least 7% weight loss, with 8.5% losing 7%-10% and 9.8% losing more than 10% of their baseline weight ii) Higher baseline BMI was associated with increased odds of weight loss, with BMI 30-34.9 (adjusted odds ratio [aOR], 1.95;) and BMI ≥ 35 (aOR, 2.08; 95%) associated with at least 7% weight loss iii) Nutritionist support (aOR, 2.04;), liver stiffness measurement ≥ 10 kPa (aOR, 1.70;), and bilirubin levels ≥ 1.2 mg/dL (aOR, 2.12;) were independent predictors of achieving at least 7% weight loss. The use of GLP-1 agonists was significantly associated with an increased likelihood of losing at least 7% weight (aOR, 1.85;) [4].



Conclusion:

Although the negative effects of obesity on health are well known, a recent publication highlights that people have a large degree of control over their own health and can protect themselves from many illnesses including age-related diseases just by reducing excess weight. In the ages of 40-50 years. Such weight reduction can be achieved without weight-loss medications or surgical interventions. Individuals who reached a healthy weight in midlife have long-term health outcomes comparable with those who maintained a healthy weight throughout adulthood. It's always worth losing weight, even those who reach a normal weight at 50 or later can still see health benefits. Establishing a consistent meal schedule, with meals timed to align with Individual's natural sleep-wake cycle, choosing a diet including plenty of fruits, vegetables, whole grains, lean proteins, & healthy fats. Intermittent fasting or time-restricted eating (TRE) also adds value. A comprehensive approach to MASLD management, encompassing medical, nutritional and lifestyle interventions remain crucial for all patients. For those without predictive factors or already exhibit early stages of MASLD close follow-up & early consideration of additional treatments are warranted to maximize therapeutic benefit.

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