



INTERMITTENT FASTING "A NEW CALORIE CLOCK"

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KEYWORDS :

Intermittent fasting is a period of Voluntary abstinence from the intake of food and drinks duration of which depends on the type of regimen

It is not a new concept and it is practised since ancient times in various religions in different patterns described in various books¹. But recently it has gained much significance as there is an increase evidence from scientific researches stating that they have many other health benefits rather than the just weight loss

It is practised in various religions from ages in various forms like: In

Hinduism : Vrata/Nombu , Fasting for 24 hrs on special days like DIWALI, SHIVARATHRI

Islam : RAMADAN, Fasting from Dawn to Dusk for a period of over 30 during EID

Christianity : LENT, Fasting during day and breaking the fast at sunset for 40 days

Buddism : BAGUAN ZHAI ,Fast from Noon to the next day Sunrise

Modern Regimens Includes :

Time Restricted Fasting³ : Feeding only during the certain hours in the day i.e only during 8 -12 hrs window period of the day

Alternate Day Fasting⁴ : involves alternating between a 24-hour "fast day" followed by a 24 hr non fasting " feast day". it includes 2 sub types :

Complete ADF : where in there will be No calorie intake during fasting days

Modified ADF : Allows consumption of 25% of daily calorie need on fasting days instead of complete fasting

Periodic Fasting² : Fasting for more than 24 hours non consecutively , like the 5:2 diet here there will be two fasting days per week, and consumption of 25% of regular daily caloric intake can be allowed, instead of complete fasting².

Mechanism by which the IF has the health benefits can be explained by three theories.

1. Ketosis Theory
2. Oxidative Stress Hypothesis
3. Circadian Rhythm Hypothesis

Main source of energy from 0 - 4 hr after feeding is the Glucose and the from 4 - 16 hrs it is the glycogen where it breakdown to glucose by glycogenolysis to provide the energy required

And then after 16 hrs there begins the metabolism of fats to produce free fatty acids which later gets converted into

Ketones to provide the energy This above whole process is known as the "METABOLIC SWITCH"¹⁰

Ketone bodies not only acts as fuel during periods of fasting. But they also act as potent signaling molecules with major effects on cell and organ functions. Ketogenesis, initiates various cellular signaling pathways known to influence health and aging. This increases the body's defenses against metabolic and oxidative stress and initiates the removal or repair of damaged molecules.

Ketogenesis also extends its activity during non fasting state by improving glucose regulation, increase stress resistance and suppress inflammation Oxidative stress theory explains about the long term benefits of IF . It states that the decreased calorie intake leads to decreased production of reactive oxygen species and decreased inflammatory process.

There are two circadian rhythms in the body, one centrally acting and the other acts peripherally. Central circadian rhythm is regulated by SUPRACHIASMATIC NUCLEUS in the Hypothalamus where as the peripheral ones are located in LIVER

SCN is entrained by Dark and Light stimulus where as the peripheral ones are entrained by Feeding as the dominant timing cue Time of day also plays the major role in the integration of energetics and metabolism as well as physiologic indices such as , physical coordination, sleep and hormonal secretion patterns

So Feeding during day time where most of the hormonal activity and the Insulin sensitivity is maximum and Fasting during nights when body is in rest mode (which is the principle in TRE IF regimen) optimizes the metabolism and improves overall health.⁹

This allows the synchronization between the Central and the Peripheral circadian rhythms and prevents the development of chronic diseases. It is hypothesized that desynchronization between the peripheral circadian clocks and SCN master clock disrupts energy balance and leads to development of chronic diseases.

Coming to the benefits of IF :

In 2012, meta analysis of 35 studies showed that there is an average weight loss of 1.5 kgs in one month but they have regained weight within 2 weeks in 16 of the follow ups

In 2013, meta analysis of 30 cohort studies have showed that during RAMADAN there is a significant reduction in the LDL, Fasting Glucose levels, Total cholesterol, Triglycerides and Inflammatory markers like TNF alpha, IL 6, CRP⁸

RAMADAN cannot be pursued as a desirable weight loss intervention because in RAMADAN the feeding pattern is in biologic opposition to human circadian rhythms

Weight Loss :

IF is associated with weight loss and most of the studies have shown that weight loss is approximately around 2.4% to 9.9%⁶ Weight loss is mainly attributed to Fat loss greater than that of Lean mass with the ratio 4 : 1 in TRE where as there is no loss of Lean mass in ADF⁷

Improves Sleep⁸ :

Several studies also showed that eating meals at abnormal Circadian rhythms leads to disruption of normal sleep pattern So aligning eating schedule with circadian rhythm can regulate body's internal clock and improves quality of sleep

Hormonal Regulation :

- IF is shown to reduce the fasting insulin levels, increases insulin sensitivity and decreases the risk of development of NIDDM
- It also increases the levels of growth hormone which helps in burning fat and muscle gain

Reduces Oxidative Stress :

IF results in decreased production of ROS and also helps to fight against ROS which were implicated in the pathogenesis of various chronic diseases and Ageing Process

Improves Heart Health :

Some studies suggest that IF can reduce the risk of heart diseases by improving Blood pressure, cholesterol levels and other risk factors

Cellular Repair :

IF improves the cellular repair by increasing the AUTOPHAGY which provides the protection for various disorders like Alzheimer's and other neurodegenerative diseases

Though it has many benefits, IF is not Recommended in Pregnant women, Breast feeding women, Growing children , Adolescence age group , Elder individuals and patients with Eating disorders and Diabetes mellitus

CONCLUSION :

Among all the forms of Intermittent Fasting regimens Time Restricted Eating is the best form as in this the intake of food (i.e Eating for 10 hrs and fasting for 14 hrs) coincides with the Circadian Rhythm, and IF has wide range of benefits ranging from Weight Loss to Reducing Oxidative Stress and Cellular Repair. But is not advisable in certain age groups as described above. All the benefits that were described were studied in smaller groups and for shorter duration but their Long term effects are still yet to be studied

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