

## Case study on Holistic Diabetic Care using Diet, Yoga, Resisted Exercises using Physioball and Walking.

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### Abstract:

**Aims and Objective:** Obesity and poor Glycaemic control among Type II diabetes Mellitus coexists. This case study where subject's obesity and glycaemic control improves substantially. **Methods:** Diet along with Specific resisted exercises using Physioball yoga and regular waling. **Results:** Unique features recorded are a reduction of HbA1C from 8% to 6%, with 6 months of treatment, physiotherapy in 65 sessions of thrice weekly duration. **Conclusion:** The outcomes of this study with larger sample size, including control subjects, various age groups are essential to further substantiate the evidence.

**Keywords HbA1C:** Glycoselated haemoglobin, Physioball: An Air inflatable ball of various sizes from 550m to 750m, Cadence: Number of steps per minute.

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### I. Introduction:

With 60 million Indian Population having known Type II diabetes (Anjana etal 2011) a shift with an early age in the onset of the metabolic disorder (Mohan etal 2003) and an increasing health care costs associated with Rs.20,000/- Annum among subjects of Type II diabetes with no complications (Shabana etal 2009 ) central obesity among Type II diabetes of Asian Indians (Ramachandran 2013). As with duration of being diabetic is associated with Mortality and Morbidity (Alain etal 2002) resisted exercises using Physioball are proven to be effective in improving glycaemic control (Subramanian 2014).

This specific case study where a young subject of 26 years Female with Type II diabetic is treated along with dietary means with specific Physioball exercises, for a period of six months duration.

### Ms. XXXX

Ms.XXX, Aged 26 Years Female, Endomorph, Menstruating (Dysmenorrhoea), on Hypothyroidism medicine, with HbA<sub>1</sub>C at 8% on Metformin.

Cadence: 60/minute

Body Weight: 70 Kg, Height: 104.cm, Resting Heart Rate: 95/min.

Post Exercises Heart Rate: 154/ Per min, Waist Circumference: 105 cm

Exercises are High intensity in nature where post exercises heart rates are increased by 80% of the maximal heart rate).

Resting Blood Pressure: 124/75 mm/ng An Architect by profession, unmarried with Family H/O of Father being Type II Diabetic, She was prescribed with Metformin, by an Endocrinologist.

She was attending this centre For Weight reduction and Diabetic Management with Physiotherapeutic means, during the period from June 2013 to December 2013.

- O/E → Range of Motion of her Peripheral joints of both Upper and Lower Extremitities are full and pain free.
- Mild exertional dyspnoea in the initial sessions.
- Ambulant unaided.

Her physical Condition after 3 Months period of 32 sessions, Following Treatment

- Waist Circumference: 98 cm (7cm reduction)
- Hba1c 7% (reduced by 1%)
- Body Weight: 61 Kg (9 kg Decrease)
- Cadence 70/ minute ( decreases by 10/minute)

Diabetologist advised her to continue exercises along with dietary means for substantial improvement of Glycaemic Control for further 3 Months.

With further reduction of waist Circumference to 89 Cms and HbA1C 16cm weight reduction in six months with treatment this, life style modifications for Further Maintenance Treatment Adopted Were as Below:

- i. Yoga postures with resistance manually given include Veerasan, Pawan Muktasana, Katichakrasana, Bhujangasana and Matsyasana.

- ii. Physioball based resisted exercises to both Lower extremities were given in Supine, Side, Prone and Sitting Postures.
  - iii. Diet instructions were given.
- Exercises were of the Nature of high intensity where post exercises heart rate has reached more than 80% of the maximal heart rate.
  - Progressions were done by increasing resistance and Repetitions.
  - With a frequency of thrice a week each session took about 30-35 minutes.
  - Presently she has got married with her HbA1C at 6.
  - Salient points with this case study are along with dietary measures, resisted exercises and Physioball, in about six months duration, with 65 Treatment sessions glycaemic control with HbA1C% at 6%.
  - Also the patient is able to sustain the progress with regular walking, Yoga postures, and diet regime.



Using Physioball resisted spinal extension in prone position.



Partial Dhanurasna using Physioball and manual resisted exercises.



Cat and camel posture using Physioball and manual resistance exercises.

**Key Points of Progression:**

- Regular Mensultral Cycle.
- HBA1C at 6 %.
- No Medication for diabetes, but adviced medical mitorning and follow her endocrinologists advice.
- Reduction in Obesity.
- Comfortable, easy with physical Movements, social skill has improved.
- Got married and settled abroad.

**II. Discussion:**

Obesity as estimated by WHO in 2008 with 1.4 million adults to be obese and has doubled in the past 30 years (WHO 2013). Diabetes tops the obesity associated conditions with economic burden in US (Anand Co Marasamy et al 2012). Yoga has proven positive physiological and mental effects in treatment of chronic conditions (Lipton 2008). resisted Exercises are proven to decrease obesity (Subramanian 2014) and improve Glycaemic control (Subramanian 2012). Possible Mechanism Includes: Irwin et al 2002 has studied exercises to promote a beneficial redistribution of body fat. Abdominal adiposity appears to have greater impact on Insulin resistance than fat deposition at other sites and exercises are effective in reducing abdominal fat. Kennedy 1999 studied that skeletal muscle is able to take up glucose from circulation predominantly via the GLUT4 transporter protein. Hayashi 1997, during exercises GLUT4 is translocated from an intra cellular location to the plasma membrane, similar to what occurs with insulin stimulation. Roberts 1999 have established nitric oxide; a potential mediator of contraction induced glucose transport, because generation of nitric oxide increases during exercises. Asmson 1997, have studied mitogen activated protein kinase in the process of exercises induced glucose transport. Hayashi 1998 have evidenced that 5- Adenosine Mmo phosphate activated protein (AMP) kinase serves as a metabolic fuel gauge and key regulator of glucose uptake during exercise; AMP kinase activity on skeletal muscle increases markedly with exercise. Kruth 1999 have recorded Activators and inhibitors of AMP Kinase are linked with translocation of GLUT4 transports. Helm rich 1991 found the positive protective effect of physical activity was strongest for individuals at high risk for Type II diabetes. Liillosa 1987 found significant correlation between glucose clearance and muscle capillary density and fibre type in human beings during euglycemic camp. Miller 1984 reported that the decline in the plasma insulin in response to oral glucose load following several months of weight training is related to an increase in muscle mass achieved by the subjects cuppers 1982 have found an increase muscle mass may help the insulin resistant space by increasing glucose storage space. Ford 2005 have recorded for weight reduction caloric restriction is the most important component, whereas increase in Physical activity are important for maintenance of weight loss from visceral depot i s evidenced with caloric restriction and exercises are combined. Unlike aerobic, higher intensities of resistance training have not only shown benefits but well tolerated by Type II diabetes mellitus (Castaneda 2002, 1% decrement hba1c can reduce the diabetes complications such as Myocardial infarction and micro vascular disease (Stratton 2006; Patel 2008).

Research study using Resisted Exercises among Type II Diabetes are as below:

S.No	Researcher And Year	Duration	Results on hba1c and Waist Circumference		
			Mean hba1c	Reduction of	Decreases in waist circumference
1	Sigal etal 2007	6 Months	1%		4cm, BMI 1Kg/ cm <sup>2</sup>
2	Dunstan 1998		2%		-
3	Salama Bweir 2009	2 ½ Months	1.6%		-
4	Castaneda	16 Week	1.2%		-
5	Cuff 2003	8 Weeks	1.34%		3 cm
6	Ekta Arora 2009	10 Weeks	1.2%		
7	Cauza 2005	12 Weeks	1.41%		-
8	Subramanian and Venkatesan 2012	12 Weeks			-
9	Toikrmidas	12 Weeks			-
10	Subramanian etal 2014	12 Weeks	1%		3 cms 4.6 Kg/cm <sup>2</sup> 4.7cms

11. This case study where a hba1c reduction by 2% and waist circumference by 16cm in 24 weeks study with resisted exercises using Physioball and diet.

### III. Conclusion:

This case study where the subjects obesity gets significantly get reduced and glycaemic control improves with a comprehensive diabetic management with due medication, diet, yoga and resisted exercises using Physioball. The result of this study can be extended with larger sample and longer duration.

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