# **DIABETES MELLITUS & HYPOXIA**





## RECURRENT HYPOXIA FROM AIRWAY OBSTRUCTION DURING SLEEP CONTRIBUTES TO THE DEVELOPMENT OF DIABETES



# DIABETIC PATIENTS HAVE BEEN FOUND TO HAVE OVERALL LOWER TISSUE OXYGENATION

(a study by Harvard Medical School and the Rotterdam hospital)

Reference value of transcutaneous oxygen measurement in diabetic patients compared with nondiabetic patients

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Purpose: This compared with Methods: In 60 neuropathy, w nondiabetic pa also assessed. Results: Diaben compared with 11.15 mm Hg, analysis showe

# Diabetics have 10-15% LOWER TISSUE OXYGEN LEVELS compared to non-diabetics

l disease or ex-matched iability was

cantly lower ere 51.77 ± . Regression .), and with

having a first-degree relative with diabetes mellitus (coefficient = -0.265; P = .003). Furthermore, the interobserver variability showed a substantial correlation for both measurements at the chest (P < .001; r = 0.654; intraclass correlation coefficient [ICC] = 0.79) and at the dorsum of the foot (P < .001; r = 0.426; ICC = 0.60).





# **OXYGEN THERAPY IMPROVES INSULIN SENSITIVITY** (a study by University of Adelaide researchers)

**DIABETIC**Medicine

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### **Short Report: Pathophysiology**

# Hyperbaric oxygen therapy improves peripheral insulin sensitivity in humans

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#### Abstract

**Aim** Hyperbaric oxygen therapy is k the mechanisms of this effect are not c hyperinsulinaemic euglycaemic clamp Oxygen therapy IMPROVES INSULIN EFFICIENCY in diabetes patients and overweight patients



# **MECHANISMS THAT WORSEN DIABETES**



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# **INCOMPLETE FATTY ACID OXIDATION MAY INTERFERE WITH...**

### **Normal Healthy Mitochondria**

Free fatty acids



Short chain acylcarnitines

### **Diabetic Mitochondria**

Incomplete oxidation of fatty acid

Free fatty acids



Long chain acylcarnitines

### Interferes with insulin signaling





# HOW OXYGEN MAY IMPROVE DIABETES CONTROL

### **Corrects the hypoxic state**

Aerobic metabolism of glucose > 个 ATP for pancreas Improved beta cell survival Reduces deterioration of insulin production

Oxygen is needed for complete oxidation of Fatty Acids > ↓ certain long chain acylcarnitines

Reduces long chain acylcarnitines Reduces insulin resistance

