Diploma Thesis

CARDIOVASCULAR RESEARCH: SLEEP APNEA AND THE METABOLIC SYNDROME

Submitted by

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0313434

In partial fulfilment of the requirements for the degree of

Doctor of Medicine

(Dr. med. univ.)

at the

Medical University of Graz

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Affidavit

Herewith I, Michael Palfner, declare that I have written the present diploma thesis fully on my own and without any assistance from third parties. Furthermore, I confirm that no sources have been used in the preparation of the thesis other than those indicated in the thesis itself.

Graz, November 2010 Signature

Acknowledgement

I would like to express my utmost gratitude to my supervisor OA. Dr. med. Natascha Tröster, whose valuable advice, expertise and encouragement were a great support in the completion of this thesis.

My thanks and appreciation also goes to Univ. Prof. Dr. med. Horst Olschewski for his support and guidance throughout the project. I am thankful to Ao. Univ. Prof. Dr. med. Hermann Toplak for his permission to carry out this project at the Department of Internal Medicine.

I would also especially like to thank Dipl. MTF Markus Dominco for his assistance in working with patients and documenting research results. I am grateful to Mag. Martin Forster for valuable support in statistical analysis.

Finally, I would like to thank my family and friends who supported me with their suggestions and patience from the beginning to the completion of the project.

Zusammenfassung

Zielsetzung/Methoden

Ziel der Studie war es einen möglichen Zusammenhang zwischen Parametern schlafbezogener Atemstörungen (SRBD) und des metabolischen Syndroms (MetS) zu untersuchen und etwaige Veränderungen der Parameter und der Inzidenz kardiovaskulärer Ereignisse unter Therapie festzustellen. Eine retrospektive Studie von 783 Patienten, überwiesen zur polysomnographischen Abklärung, wurde im Schlaflabor durchgeführt. 383 Patienten mit SRBD hatten eine weitere Kontrolluntersuchung im Studienzeitraum und konnten zur Verlaufskontrolle und Messung des Therapieerfolgs herangezogen werden. Um SRBD mit Symptomen des MetS vergleichen zu können wurden folgende Parameter untersucht: Alter, Geschlecht, Größe, Gewicht, BMI, Blutwerte von HDL, LDL, Cholesterin, Triglyzeride, CRP, Nüchternglukose (FPG) und HbA1c sowie die respiratorischen Parameter AHI, Dauer des längsten respiratorischen Ereignisses und $minO_2$. Des Weiteren wurden vorangegangene kardiovaskuläre Ereignisse (CVD) wie Myokardinfarkt (MI) und Apoplex sowie ein bestehender Diabetes mellitus (DM) anamnestisch erhoben.

Ergebnis

Von 360 Patienten, mit gutem/akzeptablem Therapieerfolg erkrankten unter Therapie 2,4% an DM, erlitten 1,5% einen MI und hatten 0,9% hatten einen Apoplex. Statistisch signifikante Veränderungen in dieser Gruppe waren: Mittelwerte von AHI (-89,2%; $p<0,001$), Dauer des längsten resp. Ereignisses (-37,4%; $p<0,001$), $minO_2$ (+13,6%; $p<0,001$), Gewicht (+0,7%; $p<0,001$), BMI (+1,5%; $p<0,001$) sowie die Blutwerte von CRP (-25%; $p<0,001$), FPG (+2,5%; $p<0,001$) und HbA1c (-1,4%; $p<0,001$). Von 23 Patienten mit schlechtem Therapieerfolg erkrankten, unter Therapie, 5% an DM, 9,5% erlitten einen MI und keiner einen Apoplex. In dieser Gruppe kam es zu keinen signifikanten metabolischen oder respiratorischen Veränderungen unter Therapie.

Conclusio

Positive airway pressure (PAP) und ähnliche Geräte stellen eine adäquate symptomatische Therapiemöglichkeit für SRBD Patienten (94% mit AHI<15 nach Therapie) dar. In Anbetracht gestiegener Werte von Gewicht, BMI, FPG und einer erhöhten CVD Inzidenz, scheint der Therapieerfolg hinsichtlich des MetS jedoch gering. Zusätzlich gab es keinen signifikanten Unterschied der CVD Inzidenzen, weder vor noch unter Behandlung, zwischen den beiden Therapiegruppen. Daher benötigen Patienten mit SRBD und MetS eine multimodale Therapie um CVD und Mortalität langfristig zu senken. Signifikant gesunkene CRP-Werte nach erfolgreicher Therapie lassen zudem vermuten, dass SRBD einen entzündlichen Zustand induzieren.

Schlagwörter: *SRBD; OSAHS; Metabolisches Syndrom; AHI; BMI; C-reaktives Protein; kardiovaskuläre Ereignisse; Myokardinfarkt; Diabetes mellitus; Apoplex*

Abstract

Objective/Methods

The aim of the study was to examine parameters of SRBD for a correlation with parameters of MetS and to investigate whether sleep specific treatment has an effect on metabolic parameters and the incidence of cardiovascular events under therapy. A retrospective review was conducted on 783 patients referred to the sleep laboratory for a polysomnography. 383 patients diagnosed with sleep-related breathing disorders (SRBD) had another monitoring consultation, which was used for trend analysis and as a measurement of therapeutic success. To compare SRBD with symptoms of metabolic syndrome (MetS) the following parameters were compiled: age, sex, weight, height, BMI, levels of HDL, LDL, cholesterol, CRP, triglyceride, FPG, HbA1c and the respiratory parameters AHI, longest duration of a respiratory event and levels of $minO_2$. Furthermore, anamnestic data on account of the existence of diabetes mellitus (DM) and previous events of myocardial infarction (MI) or apoplexy were collected.

Results

In the group of 360 patients with good/acceptable therapy success, DM occurred in 2.4%, MI in 1.5% and apoplexy in 0.9% of the patients within the study period. Statistically significant changes in this group were: AHI (-89.2%; $p<0.001$), the mean time of the longest duration of a respiratory event (-37.4%; $p<0.001$), mean level of $minO_2$ (+13.6%; $p<0.001$), mean weight (+0.7%; $p<0.001$), mean BMI (+1.5%; $p<0.001$) and also the mean levels of CRP (-25%; p 0.001), FPG (+2.5%; $p<0.001$) and HbA1c (-1.4%; $p<0.001$). In the group of 23 patients with poor success, 5% had a new onset of DM, 9.5% a MI and no apoplectic events took place under therapy. There were no statistically significant metabolic or respiratory changes in this group.

Conclusion

Positive airway pressure and related devices seem to be an adequate symptomatic treatment option for SRBD patients (94% AHI<15 after therapy). Still, the therapeutic success regarding MetS is low considering a significant increase in the mean weight, BMI, FPG levels and an increased rate of cardiovascular events. Moreover, there were no significant differences in cardiovascular incidences before treatment and within the study period between the group with good/acceptable therapy success and the group with poor therapy success. Thus, patients with MetS and SRBD require multimodal therapy to decrease cardiovascular morbidity and mortality. Furthermore, CRP level decreases after successful SRBD specific treatment suggesting that SRBD may induce a systemic inflammatory state.

Keywords: *SRBD; OSAHS; metabolic syndrome; AHI; BMI; C-reactive protein; cardiovascular events; myocardial infarction; diabetes mellitus; apoplexy*

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Abbreviations

AACE	American Association of Clinical Endocrinologists
AASM	American Academy of Sleep Medicine
ADA	American Diabetes Association
AHA	American Heart Association
AHI	Apnea-hypopnea index
APAP	Autotitrating positive airway pressure
ASCVD	Arteriosclerotic cardiovascular disease
ASV	Adaptive servo-ventilation
BiPAP	Bi-level intermittent positive airway pressure
BMI	Body mass index
BP	Blood pressure
CHD	Coronary heart disease
CHF	Congestive heart failure
Chol	Cholesterol
COPD	Chronic obstructive pulmonary disease
CPAP	Continuous positive airway pressure
CRP	C-reactive protein
CSAHS	Central sleep apnea-hypopnea syndrome
CSBS	Cheyne-Stokes breathing syndrome
CVD	Cardiovascular disease
DM	Diabetes mellitus
ECG	Electrocardiogram
EDS	Excessive daytime sleepiness
EEG	Electroencephalogram
EGIR	European Group for the Study of Insuline Resistance
EMG-AT	Electromyogram anterior tibialis
EMG-SM	Electromyogram submentalis
EOG	Electrooculogram
ESC	European Society of Cardiology
FFA	Free fatty acids
FPG	Fasting plasma glucose
HbA1c	Hemoglobin A1c,
HDL(-c)	High-density lipoprotein (-concentration)
ICSD	International Classification of Sleep Disorders
IDF	International Diabetes Federation
IFG	Impaired fasting glucose
IGT	Impaired glucose tolerance
IL-6	Interleukin-6

LDL(-c)	Low-density lipoprotein (-concentration)
MetS	Metabolic syndrome
MI	Myocardial infarction
$minO_2$	Minimum oxygen saturation
MSLT	Multiple sleep latency test
NCEP	National Cholesterol Education Program
NHLBI	National Heart, Lung and Blood Institute
NREM	Non-rapid eye movement sleep
OA	Oral appliances
OSA	Obstructive sleep apnea
OSAHS	Obstructive sleep apnea-hypopnea syndrome
PAH	Pulmonary arterial hypertension
PAI-1	Plasminogen activator-1
PAP	Positive airway pressure
PCO_2	Partial pressure of carbon dioxide
PCP	Primary care physician
PM	Portable monitoring
PO_2	Partial pressure of oxygen
PSG	Polysomnography
RDI	Respiratory disturbance index
REM	Rapid eye movement sleep
RERA	Respiratory effort-related arousal
SaO_2	Saturation of arterial blood with oxygen
SHHS	Sleep Heart Health Study
SpO_2	Saturation of partial pressure of oxygen
SRBD	Sleep-related breathing disorders
SS	Sleep specialist
SSRI	Selective serotonergic reuptake inhibitor
TG	Triglyceride
TNF-α	Tumor necrosis factor alpha
VLDL	Very low-density lipoprotein
WC	Waist circumference
WHO	World Health Organization
WHR	Waist-to-hip ratio

Sleep-Related Breathing Disorders (SRBD)

Introduction

Apnea is defined as the absence of ventilation, thus sleep apnea refers to the temporary absence or cessation of breathing during sleep (1). Sleep disorders are common among the general population (2). SRBD can impair academic and occupational performance, cause work-related and road accidents, and disturb mood and social adjustment. Private life and relationships may be adversely affected by the patient's SRBD. In addition, sleep-related breathing disorders may lead to or exacerbate serious medical, neurological and psychiatric problems. (3)

Classification

In 2005 the American Academy of Sleep Medicine (AASM) published a revised form of the International Classification of Sleep Disorders (ICSD−2). It lists 85 sleep disorders, in 8 major categories:

I. Insomnias

II. Sleep-related breathing disorders

III. Hypersomnias not due to a breathing disorder

IV. Circadian rhythm sleep disorders

V. Parasomnias

VI. Sleep-related movement disorders

VII. Isolated symptoms, apparently normal variants and unresolved issues

VIII. Other sleep disorders

Sleep-related breathing disorders (II.) are divided into 5 subgroups:

- Central sleep apnea syndromes
  - Primary central sleep apnea
  - Central sleep apnea due to Cheyne-Stokes breathing pattern
  - Central sleep apnea due to high altitude periodic breathing
  - Central sleep apnea due to a medical condition, not Cheyne-Stokes
  - Central sleep apnea due to a drug or substance
  - primary sleep apnea of infancy
- Obstructive sleep apnea syndromes
  - Obstructive sleep apnea in adults
  - Obstructive sleep apnea in pediatrics
- Sleep-related hypoventilation/hypoxemic syndromes
  - Sleep-related non-obstructive alveolar hypoventilation, idiopathic
  - Congenital central alveolar hypoventilation syndrome
- Sleep-related hypoventilation/hypoxemic syndrome due to a medical condition
  - due to pulmonary parenchymal or vascular pathology
  - due to lower airways obstruction
  - due to neuromuscular or chest wall disorders
- Other sleep-related breathing disorders
  - Sleep apnea/sleep-related breathing disorder, unspecified

Definitions

Events/indeces of sleep-related breathing disorders (SRBD) and arousals are defined here according to the AASM Manual for the Scoring of Sleep and Associated Events 2007 (4):

Apnea is defined as:

1. Reduction in airflow greater than or equal 90% of baseline, recorded by oronasal thermistors or nasal pressure cannulas.
2. Duration ≥ 10 sec.
3. Aforementioned reduction in airflow at least 90% of the event.

Classification of apneas based on respiratory effort:

1. Obstructive apnea: respiratory effort is recorded throughout the event.
2. Central apnea: absence of respiratory effort throughout the event.
3. Mixed apnea: there is an absence of respiratory effort at the beginning of the event followed by increasing respiratory effort during the second half.

Apnea-hypopnea index (AHI) is the most commonly used criterion to establish a SRBD and to quantify its severity. With the recognition of the other patterns of increased ventilatory effort, the respiratory disturbance index (RDI) was introduced, and it is slowly coming to replace the AHI. The apnea-hypopnea index (AHI) refers to the average number of apneas and hypopneas per hour of sleep. This term is not synonymous with the respiratory disturbance index (RDI), which refers to the average number of apneas, hypopneas, and respiratory effort-related arousals (RERAs) per hour of sleep. (5)

The severity of sleep apnea is defined according to following criteria in adults (from The Report of an American Academy of Sleep Medicine Task Force) (6):

Severity Code	RDI/AHI
None	<5
Mild	5-14.9
Moderate	15-30
Severe	>30

Tab. 1: AHI Severity Code

Hypopnea is defined as:

1. Reduction in airflow ≥ 30% from baseline, recorded by nasal pressure cannulas or alternatively by induction plethysmography or oronasal thermistors.
2. Duration ≥ 10 sec.
3. Aforementioned reduction in airflow at least 90% of the event.
4. Reduction in saturation ≥ 4% from baseline SpO_2% prior to the event.

Alternatively:

Hypopnea can be defined as a respiratory event that meets the following criteria:

1. Reduction in airflow ≥ 50% from baseline, recorded by nasal pressure cannulas or alternatively by induction plethysmography or oronasal thermistors.
2. Duration ≥ 10 sec.
3. Aforementioned reduction in airflow at least 90% of the event.
4. Reduction in saturation ≥ 3% from baseline prior to the event or appearance of an arousal.

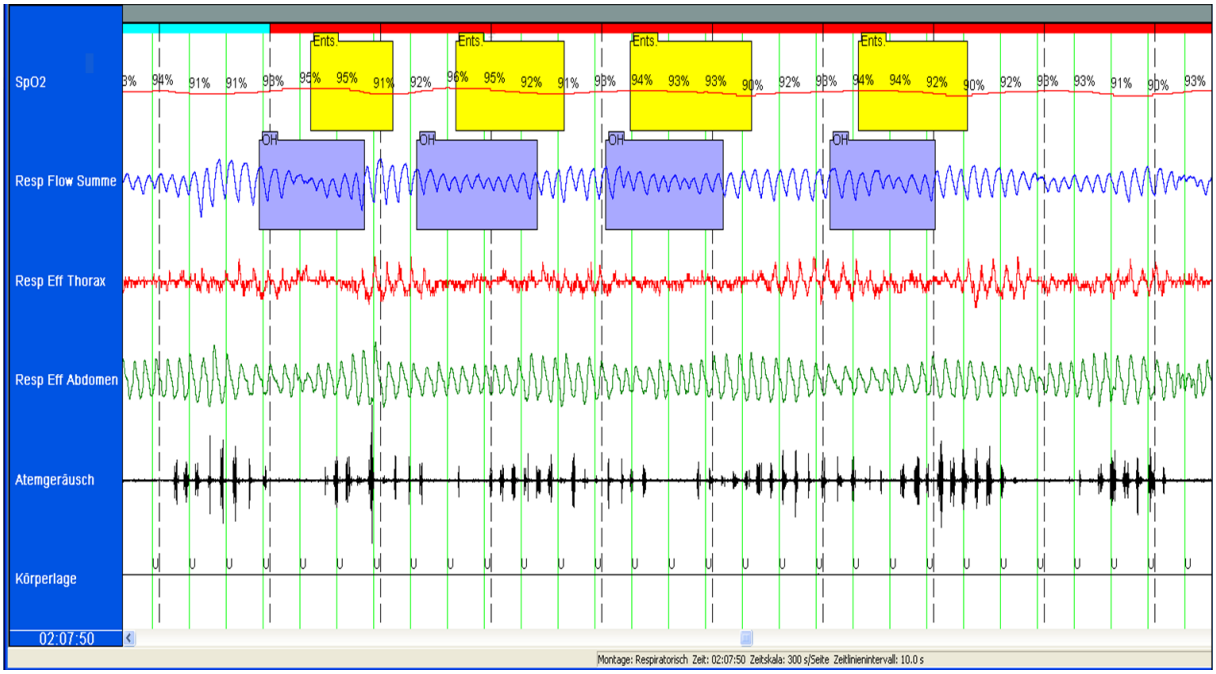


Fig. 1: Polysomnogram - Hypopnea

Obstructive Sleep Apnea-Hypopnea Syndrome (OSAHS)

The individual must fulfil criterion A, B and D, or C and D:

A. At least one of the following:

1. Sleepiness, hypersomnolence, exhaustion or insomnia

2. Arousals with feeling of asphyxiation/ suffocation.

3. Snoring, breathing pauses witnessed by sleep partner.

B. Polysomnography findings:

1. Apnea, hypopnea or RERAs ≥ 5 per hour of sleep.

2. Recording of respiratory effort during part of or the whole event.

C. Polysomnographic findings:

1. Apnea, hypopnea or RERAs ≥ 15 per hour of sleep.

2. Recording of respiratory effort during part of or the whole event.

D. The disorder cannot be attributed to other conditions, use of medicines or other substances.

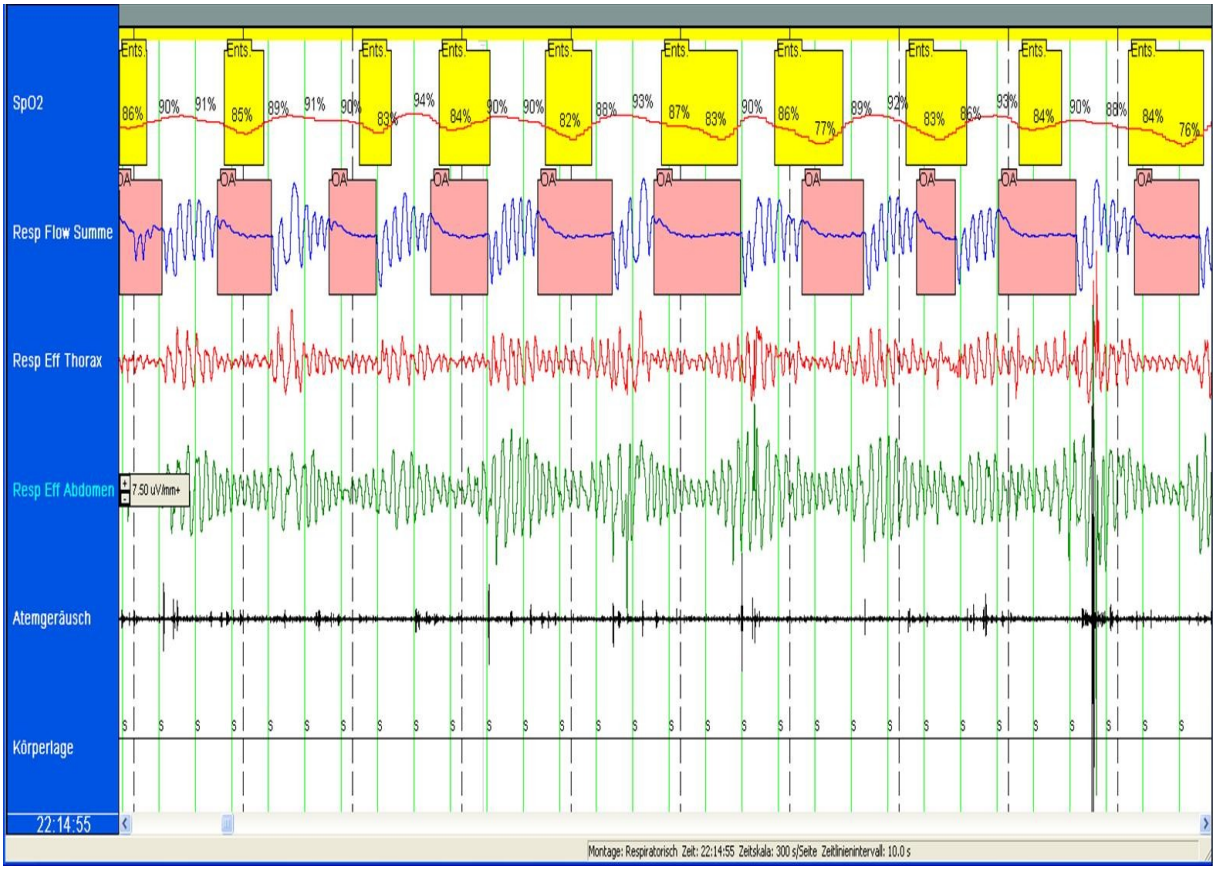


Fig. 2: Polysomnogram - Obstructive Sleep Apnea

Central Sleep Apnea-Hypopnea Syndrome (CSAHS)

The individual must fulfil criteria A, B, and C.

A. Patient reports at least one of the following: daytime sleepiness, frequent arousals or insomnia, arousals with dyspnea.

B. Polysomnography reveals ≥ 5 central apneas per hour of sleep.

C. The disorder cannot be attributed to other conditions, use of medicine or substances.

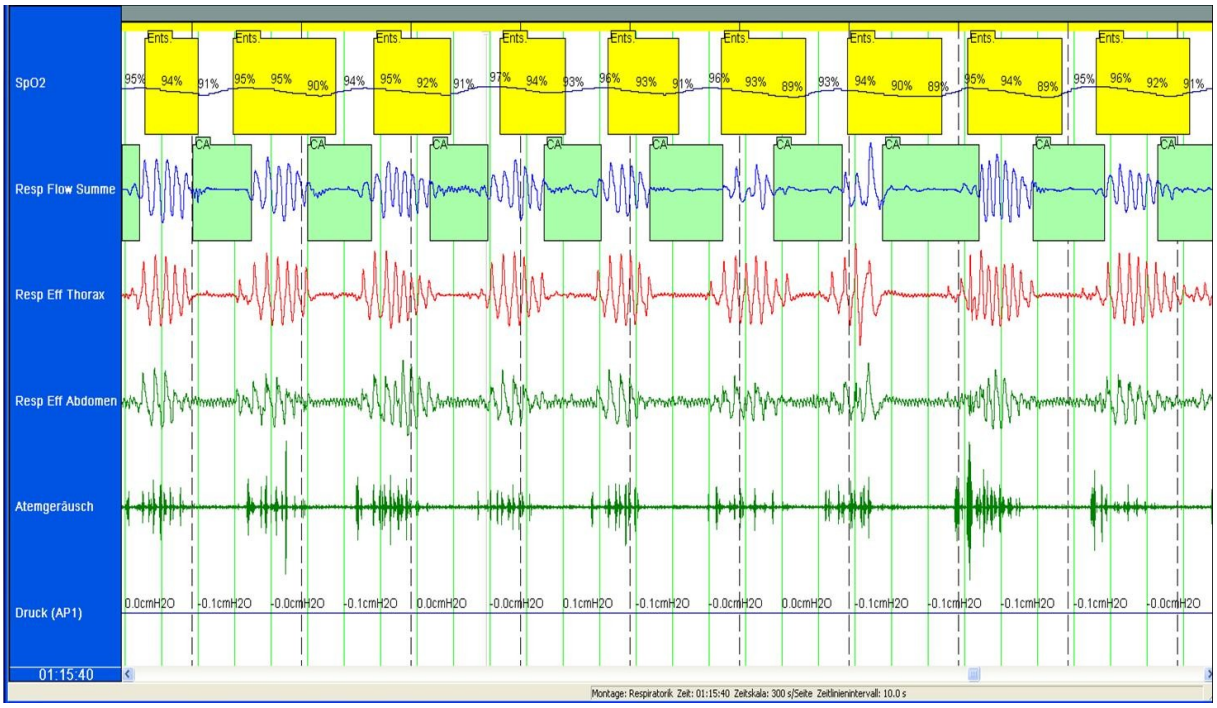


Fig. 3: Polysomnogram - Central Sleep Apnea

Respiratory Effort-Related Arousal (RERA)

RERA is a breathing disorder characterized by obstructive upper airway airflow reduction (which does not meet the criteria of apnea or hypopnea), associated with increased respiratory effort that is resolved the appearance of arousals (RERAs). It is preferably recorded with esophageal manometry, although nasal manometry or induction plethysmography is also appropriate. Diagnostic criteria include:

1. A series of respiratory cycles of increasing/ decreasing effort or flattening, recorded by nasal manometry and leading to an arousal that cannot be defined as apnea or hypopnea.

2. Duration ≥ 10 sec.

Cheyne-Stokes Respiration

Cheyne-Stokes respiration is established by recording at least three crescendo-decrescendo fluctuations in respiration, as well as one of the following:

1. Five or more central apneas or hypopneas per hour of sleep

2. Duration of crescendo-decrescendo fluctuations in respiration over at least 10 continuous minutes

Cheyne-Stokes Breathing Syndrome (CSBS)

The individual must fulfil criteria A,B and C

A. Polysomnography reveals at least 3 consecutive cycles of crescendo- decrescendo fluctuations in breathing amplitude, combined with at least one of the following criteria:

a. Five or more central apneas or hypopneas per hour of sleep.

b. Duration of crescendo-decrescendo fluctuations is at least 10 consecutive minutes.

The pattern of Cheyne-Stokes respiration varies in duration and usually lasts about 60 seconds.

B. Severe comorbidities, such as congestive heart failure, cerebrovascular diseases and renal failure.

C. The disorder cannot be attributed to other conditions, use of medicines or other substances.

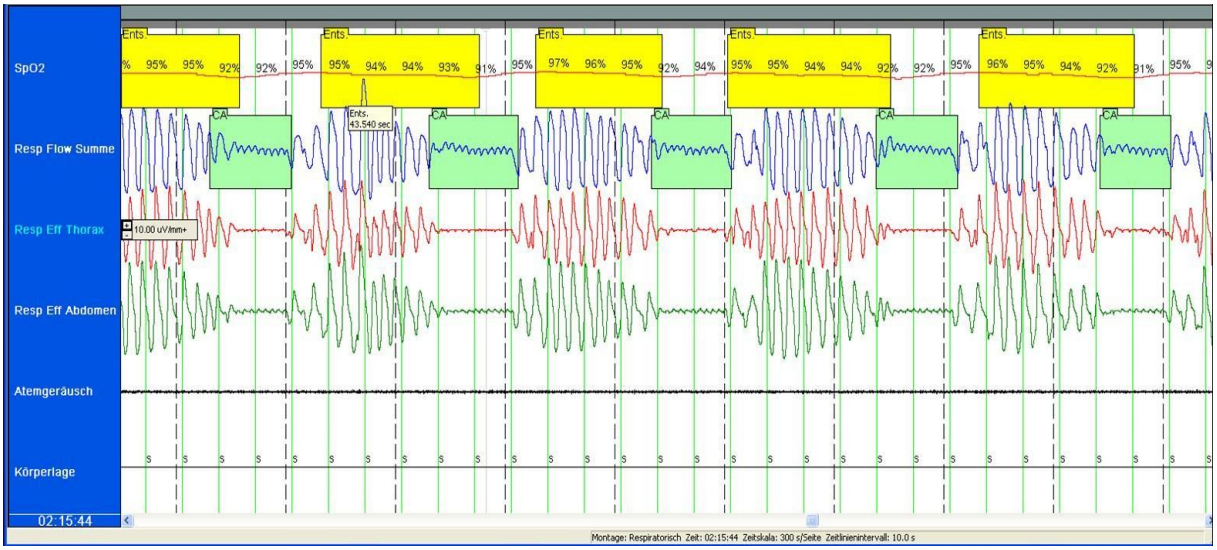


Fig. 4: Polysomnogram - Cheyne-Stokes Breathing

Pathophysiology

Cessation of breathing during sleep can result from upper airway obstruction (obstructive apnea), loss of ventilatory effort (central apnea), or a combination of the two (mixed apnea). Central sleep apnea differs from obstructive or mixed apnea because of the absence of upper airway obstruction and subsequent ventilatory attempts against an occluded airway. The vast majority of patients with central apneas also have obstructive events and so central and obstructive sleep apnea are rarely seen in isolation. This suggests that the mechanisms responsible for the different types of apnea must overlap. (7, 8)

Obstructive Apnea

Patients with obstructive sleep apnea have been shown to have a narrowed, more collapsible pharyngeal airway. Sleep-related reduction in upper airway dilating muscle activity can lead to greater negative intraluminal pharyngeal pressure, which leads in turn to further narrowing and complete closure of the airway (9). There are several possible mechanisms explaining the etiology of the enlargement of the upper airway soft tissues structures in apneic individuals, including edema secondary to negative pressure from airway closure or trauma (10), weight gain (11), muscle injury (12), gender (13) and genetic factors (14). (9)

Central Apnea

Central apneas are defined as pauses in ventilation with a loss of inspiratory drive. As expected, studies have demonstrated a complete loss of electromyographic activity of the respiratory muscles during such apneas with a resumption of normal ventilatory muscle activity after these events (15). Although the cause of central apnea in many patients remains obscure, investigation has pointed to a number of possible mechanisms, all of which are characterized by instability of respiratory control: (7)

Control of Breathing

Ventilation is controlled by many processes that have been grouped into three categories (16). The first is the automatic or metabolic control system, consisting of the chemoreceptors (carotid body for hypoxia and carotid body plus medullary chemoreceptor for hypercapnia), vagally mediated intrapulmonary receptors and numerous brainsteam mechanisms. The

second system is called the “behavioural” control system. Activities of normal life, such as eating and talking, influence ventilation and are thought of as behavioural or volitional influences. The third control process in awake humans is referred to as the “wakefulness” stimulus, with increased ventilation being inherent to the waking state. During sleep, there is a loss of voluntary control and a decrease in ventilatory response to both low oxygen and high carbon dioxide levels. Particularly in non-rapid eye movement sleep (NREM), breathing is controlled almost solely by the metabolic control system, with ventilation tightly linked to afferent input from chemoreceptors and vagal intrapulmonary receptors. Both hypoxemic and hypercapnic responses are most depressed in rapid eye movement sleep (REM). (7, 17, 18)

It has been confirmed by various studies that PCO_2 is the dominant ventilatory stimulus during sleep and that there is a linear relationship between increasing PCO_2 and ventilation, with only a small rise above the resting PCO_2 level being required to increase ventilation. The hypoxic drive, on the other hand, is a hyperbolic response, with little change in ventilation occurring despite fairly large fluctuations in PO_2 around the normal range (100-80mmHg). (7, 19, 20)

Central Apnea Caused by Ventilatory Control Instability

Each individual has an “apnea threshold”, a PCO_2 level below which apnea is commonly seen. Bradley et al. (21) observed two distinct groups of patients with central apneas. One had a low hypercapnic ventilatory response and hypercapnia during wakefulness (patients with alveolar hypoventilation and the obesity-hypoventilation syndrome would fall into this group). These individuals have almost no measurable chemosensitivity during wakefulness and when they are asleep, hypoventilation becomes worse and there may be little residual drive to ventilation because metabolic mechanisms are defective. In contrast, the other group, patients with idiopathic central sleep apnea, tended to have a high hypercapnic response and low arterial PCO_2 levels during wakefulness. Therefore, these patients breath very close to their PCO_2 apnea threshold during sleep. (7)

Careful examination of the actual respiratory pattern suggests, that other mechanisms must be involved as well. Studies strongly suggest that the mechanisms involved in respiratory switching (expiration to inspiration) are affected by this disorder and the long expiratory pause, characterizing central apneas, may also be influenced not only by the chemoreceptors,

but other mechanisms too (lung volume, chest wall mechanoreceptors, blood pressure) (22). However, the individual contribution of these inputs to the cycling respiratory pattern is still unclear.

It has long been recognized that congestive heart failure is associated with Cheyne-Stokes respiration during sleep, characterized by a crescendo-decrescendo ventilatory pattern with a central apnea or hypopnea at the nadir. The Cheyne-Stokes breathing pattern is almost entirely a product of ventilatory control system instability resulting from both a prolonged circulation time and increased ventilatory responsiveness to rising PCO_2. Still, both conditions are required for this respiration to emerge and so heart failure severity alone does not account for the presence or absence of this breathing pattern. Cheyne-Stokes respiration seems to occur in neurology patients as well (23) but the characterisation of these ventilatory patterns and the mechanisms still remain lesser understood. (7)

Upper Airway Causes of Central Apnea

Though the reason remains obscure, it is generally acknowledged that the common cold is associated with sleep disturbance such as central and obstructive sleep apnea (7, 24). Nasal obstruction, whether occurring naturally as in allergic rhinitis (25) and deviated nasal septum (26), or produced artificially (24), can lead to sleep-disordered breathing, possibly induced due to nasal airflow receptors (27). Studies also suggest that pharyngeal airway reflexes may initiate apneas. Issa et al. (28) reported that pharyngeal airway collapse during sleep may initiate reflexes inhibiting respiration, thus yielding central apneas.

Neurologic Disorders and Central Sleep Apnea

Ventilation during sleep is highly dependent on the metabolic control system. Hence, any neurological disorder affecting this system could influence the ventilatory pattern, possibly leading to central sleep apnea. Patients with autonomic dysfunction (29) or diabetes mellitus (30) frequently have apneas generally of central origin. Processes such as tumors (31), infarction (32), hemorrhage (33) and encephalitis (34) can damage the medullary area, leading to breathing dysrhythmias during sleep. (7)

Epidemiology

The most common form of sleep-related breathing disorders (SRBD) is the obstructive sleep apnea-hypopnea syndrome (OSAHS). The Wisconsin Sleep Cohort Study reported that 4% of men and 2% of women in a middle-aged cohort (aged 30 to 60) had obstructive sleep apnea, as defined by an apnea-hypopnea index (AHI) of greater than 5 associated with daytime hypersomnolence (11). Since this report in 1993, the general population has become heavier and older. The risk for significant sleep-related breathing disorders (SRBD) rises both with body mass index and age. It is difficult to identify a precise prevalence for sleep apnea for two reasons: risk factors in the general population are increasing and the diagnostic criteria continue to change. However, the Sleep Heart Health Study (SHHS) reported that 22% of a group of 1824 people had a respiratory disturbance index (RDI, which in the context of this research was the same as the AHI) of greater than 15 events per hour, which most practitioners would consider to be significant sleep apnea (35). It has been estimated that 5% of adults in developed countries have OSAHS with sleepiness, and an unknown percentage have SRBD without overt of sleepiness (2). The Cleveland Family Study of 285 individuals without significant sleep apnea at baseline reported that the incidence of developing SRBD (as defined by an AHI greater than five events per hour) is about 7% per year, and the incidence of developing an AHI of greater than 15 events per hour is about 2% per year (36, 37). After the menopause, the incidence of SRBD rises in women, and the prevalence difference between the sexes is essentially the same (38). OSAHS prevalence has been established in few populations other than those of Western nations and therefore both the worldwide importance of OSAHS, as well as potentially important racial or ethnic prevalence patterns, are poorly understood (2).

The prevalence of most disorders that are connected with central sleep apnea have been minimally studied, due to the fact that most are believed to be relatively uncommon. Cheyne-Stokes respiration may be an exception, as a high prevalence has been observed in patients with congestive heart failure (39). The reported frequency of disordered breathing, and in particular the individual patterns, varies depending on the population studied, the methods used for apnea detection and the threshold used do define abnormalities. (7) According to Lugaresi et al. (40) central apneas lasting 5-15 sec may appear during light and REM sleep in normal subjects. Carskadon and Dement (41) found that 37.5% of all subjects over the age of

62 had apneas or hypopneas, and that most of the time, when determinations were possible, apneas were primarily central.

In the four studies that specifically considered patients with symptomatic idiopathic central sleep apnea, no consistent epidemiological trends emerged. Guilleminault et al. (42), White et al. (43) and Bradley et al. (21) reported a strong male predominance; Roehrs et al. (44) observed central apnea more commonly in women. No explanation can be offered for this discrepancy. All studies, however, noted this disorder to occur most commonly in middle-aged to older adult individuals, although a few younger patients have been reported. (7)

Diagnostics

Questionnaires

Asking patients to report their symptoms is a valid, cost-efficient and simple act for clinicians and primary care physicians in diagnosing sleep apnea. 120 pulmonary and primary care physicians from the U.S. and Germany took part in the Conference on Sleep in Primary Care in April 1996 in Berlin, Germany. As an outcome of this conference, the Berlin Questionnaire contains a combination of items regarding snoring, body habitus, witnessed apneas and associated disorders such as hypertension. One introductory question and four follow-up questions concern snoring; three questions address daytime sleepiness, with a subquestion about sleepiness behind the wheel (that is, while driving a motor vehicle). The last question concerns the existence of high blood pressure. Generally, patients are also asked to provide information on age, weight, height, sex, neck circumference and ethnicity. Obesity is quantified by calculating body mass index from self-reported weight and height (45).

The Berlin Questionnaire

Height Weight	Age Gender
Category I	
Has your weight changed in the last 5 years?	Increased Decreased
Do you snore?	Yes No Do not know
Your snoring is	Slightly louder than breathing As loud as talking Louder than talking Very loud
How often do you snore?	Nearly every day 3-4 times per week 1 to 2 times per week 1 to 2 times per month Never or almost never
Has your snoring bothered other people?	Yes No
Has anyone noticed that quit of breathing during your sleep?	Almost every day 3 to 4 times per week 1 to 2 times per week 1 to 2 times per month Never or almost never

Category II		
Are you tired or fatigued after sleeping?	Nearly every day 3 to 4 times per week 1 to 2 times per week 1 to 2 times per month Never or almost never	
While awake do you feel tired, fatigued, or not up to par?	Nearly every day 3 to 4 times per week 1 to 2 times per week 1 to 2 times per month Never or almost never	
Have you ever fallen asleep while driving?	Yes No	
If so, how often does it occur?		Nearly every day 3 to 4 times per week 1 to 2 times per week 1 to 2 times per month Never or almost never
Category III		
Do you have high blood pressure?	Yes No Do not know	

Tab. 2: The Berlin Questionnaire

In category 1, high risk is defined as persistent symptoms (3 to 4 times/wk) in two or more questions about their snoring. In category 2, high risk is defined as persistent (3 to 4 times/wk) waketime sleepiness, drowsy driving, or both. In category 3, high risk is defined as a history of high blood pressure or a body mass index of more than 30 kg/m2. To be considered at high risk for sleep apnea, a patient has to qualify for at least two symptom categories. Those who deny having persistent symptoms or who qualify for only one symptom category are placed in the lower risk group (45). Even though these questionnaires have been shown as a helpful tool in sleep apnea diagnostics (46), clinicians can't exclude patients just on the basis of a low score on a questionnaire.

Polysomnography

The present reference or "gold" standard for evaluation of sleep and sleep-related breathing is the in-laboratory polysomnogram (PSG) (47), which was established through evidence-based reviews conducted by the American Academy of Sleep Medicine (AASM). This method has been proven to be accurate with a low failure rate because the study is attended by technical staff (48). Possible forms of error involved in the measurement of sleep and breathing with polysomnographics include data loss, artifacts, intra and inter-rate event recognition errors and measurement errors. Since the PSG is considered to be the reference standard, the reliability and technical accuracy of PSG is generally accepted without question. However, PSG, even when accurately measured, recorded, and analyzed, may misclassify patients based upon night-to-night variability in measured parameters, the use of different types of leads that may lead to over- or underestimation of events (for instance, use of thermistors vs. nasal cannula), and the vagaries of the clinical definitions of disease. For example, estimates of the sensitivity of one night of PSG to detect an AHI > 5 in patients with OSAHS range between 75 and 88% (47).

Recording Montages for Polysomnography adapted from the AASM (47, 49):

Polysomnographic Recording Montages

Parameter	Level I (Attended Standard PSG)	Level II (Comprehensive Portable PSG)
Electroencephalogram (EEG)	+	+
Electrooculogram (EOG)	+	+
Electromyogram submentalis (chin) (EMG-SM)	+	+
Electrocardiogram (ECG)	+	+
Airflow	+	+
Respiratory effort (abdominal/thoracic)	+	+
Arterial oxygen saturation (SaO_2)	+	+
Body position	+	Optional
Electromyogram anterior tibialis (EMG-AT)	+	+
Attended	+	-

Tab. 3: Polysomnographic Recording Montages

Portable Polysomnography

PSG, however, is considered to be relatively expensive and technically complex. Portable monitoring (PM) has been utilized as an alternative diagnostic test for OSA based, in part, on the premise that it is less expensive and quicker to deploy compared to an in-laboratory PSG. However, there is a paucity of evidence showing that PM is equivalent to PSG in regards to diagnosis, treatment and outcomes. (48)

Digital Video

Although digital video recordings are widely used in the evaluation of parasomnias and seizures in some sleep laboratories, it is believed that there may be an additional role for this technology in the evaluation of sleep breathing disorders (50). When the digital video is perfectly synchronized with a digital polysomnogram, ambiguous or difficult-to-interpret polysomnographic events are frequently clarified. Digital video may be especially helpful for documenting upper airway resistance syndrome. For example, it is easy to recognize a small dip in arterial oxygen saturation (SaO_2) followed by oxygen resaturation as being significant when it corresponds to other events captured on video. These might include an audible snort, a repetitive jutting out of the jaw or arching of the neck, or a closing of a gaping mouth, in an attempt to re-establish unobstructed breathing. Without the other visual information, the polysomnographic SaO_2 dip would quite likely be ignored or dismissed as artifact. Banno et al. (50) have found this approach to be particularly useful in slim individuals who may not have oxygen desaturation with their abnormal respiratory events. Furthermore, showing the sleep study video to patients so that they can see what they do during sleep can be a very effective tool to promote understanding of the problem and an appreciation of its severity. (51)

Symptoms

Daytime Sleepiness

Excessive daytime sleepiness (EDS) is defined as a condition in which one often enters sleep at an inappropriate time or setting. As a subjective symptom hypersomnolence is hard to quantify but can be measured subjectively using questionnaires such as the Epworth Sleepiness Scale or objectively employing the multiple sleep latency test (MSLT).

In the Wisconsin Sleep Cohort Study, 22.6% of women and 15.5% of men tested with an AHI of 5 or higher reported frequent occurrence (≥ 2 days per week) of hypersomnolence (11). It seems that patients with idiopathic central sleep apnea complain less often of hypersomnolence than patients with obstructive sleep apnea, although such daytime sleepiness has been commonly described in patients with central apnea (21). As the proportion of obstructive or mixed events increases in these patients (still with predominantly central apnea), hypersomnolence may become more frequent. (7)

Severity of EDS

According to a report by the American Academy of Sleep Medicine Task Force (52):

1. Mild: Unwanted sleepiness or involuntary sleep episodes occur during activities that require little attention. Examples include sleepiness that is likely to occur while watching television, reading or traveling as a passenger. Symptoms produce only minor impairment of social or occupational functions.

2. Moderate: Unwanted sleepiness or involuntary sleep episodes occur during activities that require some attention. Examples include uncontrollable sleepiness that is likely to occur while attending activities such as concerts, meetings or presentations. Symptoms produce moderate impairment of social or occupational functions.

3. Severe: Unwanted sleepiness or involuntary sleep episodes occur during activities that require more active attention. Examples include uncontrollable sleepiness while eating, during conversation, walking or driving. Symptoms produce marked impairment in social or occupational functions.

Snoring

Snoring is the sound created by turbulent airflow vibrating against upper airway soft tissues. It is usually worse in the supine position, after sleep deprivation or alcohol ingestion (53, 54). According to Young et al. (11) (Wisconsin Sleep Cohort Study), habitual snoring occurs in 36% in adults and in more than 70% in subjects with an AHI of 5 or higher. Snoring is probably the most common complaint precipitating a referral to a sleep laboratory. Often recognized by a bed partner, irregular snoring as consequence of a re-opening of closed upper airways is the most common symptom of the OSAHS.

Insomnia

Restless sleep and awakenings are also common symptoms in sleep apnea. The primary complaint of many patients with central sleep apnea tends to be insomnia, restless sleep, or frequent awakenings during the night (7, 21, 43). 18% to 31% of OSAHS patients report a sensation of choking or dyspnea that interrupts sleep. Additionally, about half of OSAHS patients report restless sleep (tossing and turning) and diaphoresis, usually in the neck and upper chest area, probably caused by increased breathing efforts during periods of upper airway obstruction (55, 56). The effects of sleep loss on performance include changes in cognitive performance, difficulty with working memory, slowing of response across the duration of the task, declines in the best effort or fastest response, lapses and false responses. Several studies found robust differences in cognitive processing in moderate to severe OSAHS patients (AHI>15) compared with normal controls. Personality changes, such as aggressiveness, irritability, anxiety or depression, may also be observed (57–59).

Others

Morning or nocturnal headaches, often described as dull and generalized, are a major complaint in about half of the patients (55). Paiva et al. (60) found OSAHS to be the main cause of nocturnal or morning headaches in general.

Nycturia seems to be a relatively common symptom in OSAHS. According to Hajduk et al. (61), 28% of the interviewed patients report pathological nocturia (four to seven times per night).

About 74% of patients report having a *dry mouth* and the need to drink water either in the morning or during the night (55).

The prevalence of sleep apnea also shows a strong impact on *erectile function* and subsequently negatively affects sexual activity and decreases libido, but with a significant improvement under continuous positive airway pressure (CPAP) therapy (62, 63).
As a result of an increased intra-abdominal intra-thoracic pressure gradient *esophageal reflux* (64) and nocturnal bruxism (65) are also commonly seen in patients with sleep apnea.

Associated Disorders

Metabolic Dysfunction

It is well established that the numerous sequelae of obesity include conditions such as hypertension, type 2 diabetes mellitus and sleep apnea. The fact that diabetes mellitus, the metabolic syndrome and sleep apnea share several common risk factors makes it hard to separate a causal from a non-causal association between these disorders. It has also been displayed by several animal and human studies that hypoxia can have measurable effects on insulin sensitivity. Elevated levels of interleukin-6, tumor necrosis factor-α, and leptin (factors known to increase the predisposition to metabolic dysfunction) are found in patients with sleep apnea (66–68). According to The Sleep Heart Health Study, sleep-disordered breathing is associated with glucose intolerance and insulin resistance independent of age, gender, smoking status, body mass index, regional adiposity and self-reported sleep duration. In this study, hypoxemic stress and sleep disruption were found to be associated with impairment of metabolic function (69). Still, the mechanisms of glucose intolerance and resistance as well as type 2 diabetes in sleep apnea are not known yet and further studies are needed to define the underlying processes.

Cardiovascular Disorders

Sleep related breathing disorders, both central and obstructive, adversely affect cardiovascular function, acutely and chronically. There are three basic pathophysiological consequences resulting from apnea and hypopnea: intermittent arterial blood gas abnormalities characterized by hypoxemia-reoxygenation and hypercapnia-hypocapnia; arousals and shift to light sleep stages; and large negative swings in intrathoracic pressure (70–72). The cardiovascular effects of sleep apnea may be mediated by redox-sensitive gene activation, altered autonomic nervous system activity, oxidative stress and the release of inflammatory mediators.

Several epidemiological studies have shown statistically significant associations of polysomnographically determined OSAHS and *hypertension*. In the Wisconsin Sleep Cohort Study, Peppard et al. (73) found a relationship between sleep-disordered breathing and hypertension, measured over a four-year period, after adjustment for habitus, age, sex as well as cigarette and alcohol abuse. Individuals with few episodes of apnea or hypopnea (0.1 to 4.9 events per hour) at baseline had 42 percent greater odds of having hypertension at follow-up than individuals with no episodes. Those people with mild sleep-disordered breathing (as defined by an apnea–hypopnea index of 5.0 to 14.9 events per hour) and those with more severe sleep-disordered breathing (as defined by an apnea–hypopnea index of 15.0 or more events per hour) had approximately two and three times, respectively, the odds of having hypertension at follow-up of those with no episodes of apnea or hypopnea.
Since 1998, the World Health Organization has recognized sleep-disordered breathing as a secondary cause of *pulmonary arterial hypertension* (PAH). Defined as an elevation in the mean pulmonary artery pressure to at least 20mmHg the prevalence of PAH in OSAHS varies from 15% to 70% (5, 74). Excluding chronic obstructive pulmonary disease (COPD), Bady et al. (74) found a prevalence of 27% (in patients with an AHI >20/h) and Sanner et al. (75) a prevalence of 20% (AHI>10h). In conclusion, mild PAH in OSAHS is common and may occur in the absence of COPD as well as daytime hypoxemia. (5)

A variety of *atrioventricular arrhythmias*, including complete heart block and ventricular asystole during sleep, have been observed in patients with sleep apnea and can often be eliminated by using a nasal CPAP (76, 77).
Several studies in patients with *systolic heart failure* show that about 40-80% of such patients have an AHI of 15 events per hour (78). Kanagala et al. (79) reported that the recurrence rate of atrial fibrillation at 12 months in untreated subjects with OSAHS was 82%, versus 42% in the treated OSAHS group and 53% in the control group without diagnosed OSAHS.

Therapy

Guidelines according to the AASM OSA Task Force (80):

There are medical, behavioural and surgical options for the treatment of OSAHS. Adjunctive therapies are used to supplement the primary treatment options.

Positive Airway Pressure (PAP)

PAP is the treatment of choice for mild, moderate and severe OSAHS. PAP provides pneumatic splinting of the upper airway and is effective in reducing the AHI. PAP may be delivered in continuous (CPAP), bi-level (BiPAP) or autotitrating (APAP) modes. PAP applied through a nasal (standard), oral or oronasal interface during sleep is the preferred treatment for OSAHS (81). CPAP is indicated for the treatment of moderate to severe OSAHS as standard and optional for mild OSAHS. After initial PAP setup, long-term follow-up is indicated yearly and where needed to troubleshoot PAP mask, machine or usage problems. (47)

Adaptive Servo-Ventilation (ASV)

ASV is an emerging novel method for Cheyne-Stokes breathing and patients with central, mixed or complex sleep apnea who may be noncompliant or nonresponsive to PAP devices (82). The ASV support is minimal during the hyperpneic phase of periodic breathing and maximal during periods of diminished breathing and central apnea. According to Teschler et al. (83), patients preferred the ASV night to either the CPAP or bi-level titration nights, and sleep and breathing seem to be better during ASV therapy than during nasal oxygen or a nasal CPAP titration.

Recent studies suggest that heart failure patients with coexisting obstructive sleep apnea and Cheyne-Stokes respiration/central sleep apnea may benefit more from treatment with ASV than with CPAP. (84)

Behavioural Strategies

Behavioural treatment options include weight loss, ideally to a BMI of 25kg/m² or less, exercise, positional therapy and avoidance of alcohol and sedatives before bedtime.

Weight loss should be recommended for all overweight patients, always combined with primary treatment because of the low success rate of dietary programs alone. (85)

Positional therapy, keeping the patient in a non-supine position, is an effective secondary therapy or can be a supplement to primary therapy for position-dependent OSAHS patients. (85)

Oral Appliances (OA)

Custom made oral appliances (mandibular repositioning appliances, tongue retaining devices) may improve upper airway patency by enlarging the upper airway and/or by decreasing upper airway collapsibility (86). Although not as effictive as CPAP, OA are indicated for use in patients with mild to moderate OSAHS who prefer OA, or who fail CPAP or behavioural measures. (85)

Surgical Treatment

Evaluation for primary surgical treatment can be considered in patients with mild OSAHS who have severe obstructing anatomy that is surgically correctible (such as tonsillar hypertrophy). Surgical procedures may be considered as a secondary treatment for OSAHS when the outcome of PAP therapy is inadequate or as an adjunct therapy when obstructive anatomy or functional deficiencies compromise other therapies or to improve tolerance of other OSAHS treatments.

Adjunctive Therapies

Bariatric surgery is an effective means of achieving major weight loss and may be adjunctive in the treatment of OSAHS in obese patients (85). Yet, the remission rate for OSAHS two years after bariatric surgery is 40%, emphasizing the need for ongoing clinical follow-up of these patients. (87)

There are no widely effective pharmacotherapies for OSAHS with the important exceptions of individuals with hypothyroidism or acromegaly (88). Specifically, selective serotonergic uptake inhibitors (SSRIs), protriptyline, methylxanthine derivatives, and estrogen therapy are not recommended for the treatment of OSAHS (85). Short-acting nasal decongestants are not recommended in the treatment of OSAHS, but topical nasal corticosteroids may improve the AHI in patients with OSAHS and concurrent rhinitis, and thus may be useful adjunct to primary therapies. (85)

Oxygen supplementation is not recommended as a primary treatment for OSAHS. Oxygen alone may reduce nocturnal hypoxemia but may also prolong apneas and may potentially worsen nocturnal hypercapnia in patients with comorbid respiratory disease (89).
Modafinil, used in addition to PAP therapy, is recommended for the treatment of residual excessive daytime sleepiness in OSAHS patients who have sleepiness despite effective PAP treatment and who lack any other identifiable cause for their sleepiness. (85)

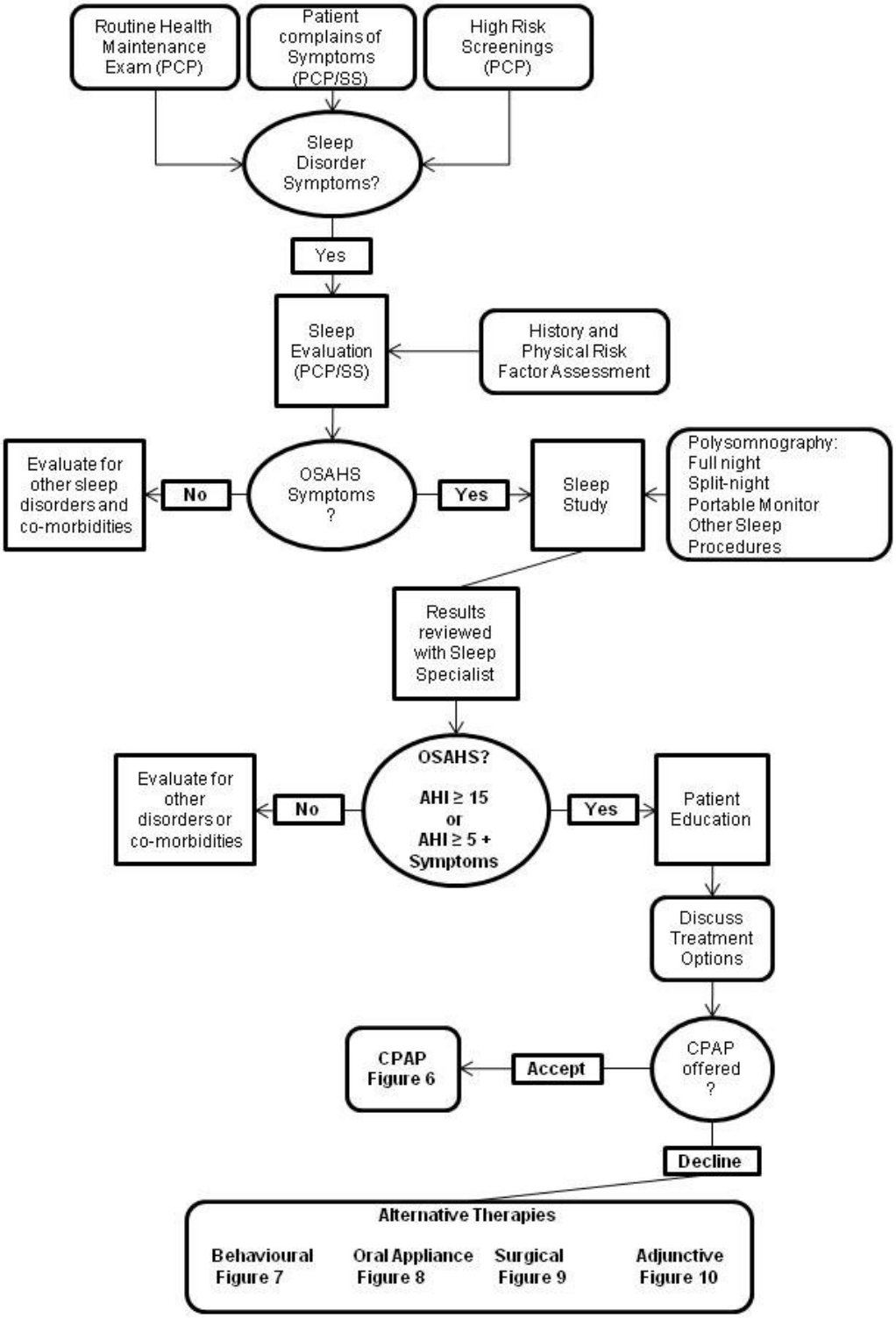
Long-Term Management

All patients with OSAHS should have ongoing, long-term management for their chronic disorder. Those on chronic therapy should have regular, ongoing follow-up to monitor adherence to therapy, side effects, development of medical complications related to OSAHS and the continued resolution of symptoms. Those who have eliminated OSAHS (weight loss, surgery) should be monitored for continued risk factor modification and to look for recurring symptoms. (80)

CSAHS

Due to scarce data and the lack of large numbers of patients with central sleep apnea the treatment of central sleep apnea must be individualized and adjusted to the cause of the ventilatory instability. The logical first approach to the treatment of central sleep apnea is to rule out treatable causes like nasal obstruction, pharyngeal collapse, congestive heart failure and medications. If present, the abnormality should be treated aggressively and pathological conditions should be corrected.
If the patient is obese and snoring or has heart failure, nasal CPAP may be an appropriate first choice (28, 90). Patients with central, mixed or complex sleep apnea who are noncompliant or nonresponsive to PAP device may receive greater benefit from treatment with ASV than with CPAP (82, 84). If the patient is hypoxemic during central apneas, or the apneas have a clearly periodic nature, then nocturnally administered oxygen may be most appropriate. (91)

The following tables were adapted from the AASM OSA Task Force (80):



PCP = primary care physician, SS = sleep specialist

Fig 5: SRBD Therapeutic Scheme – Evaluation.

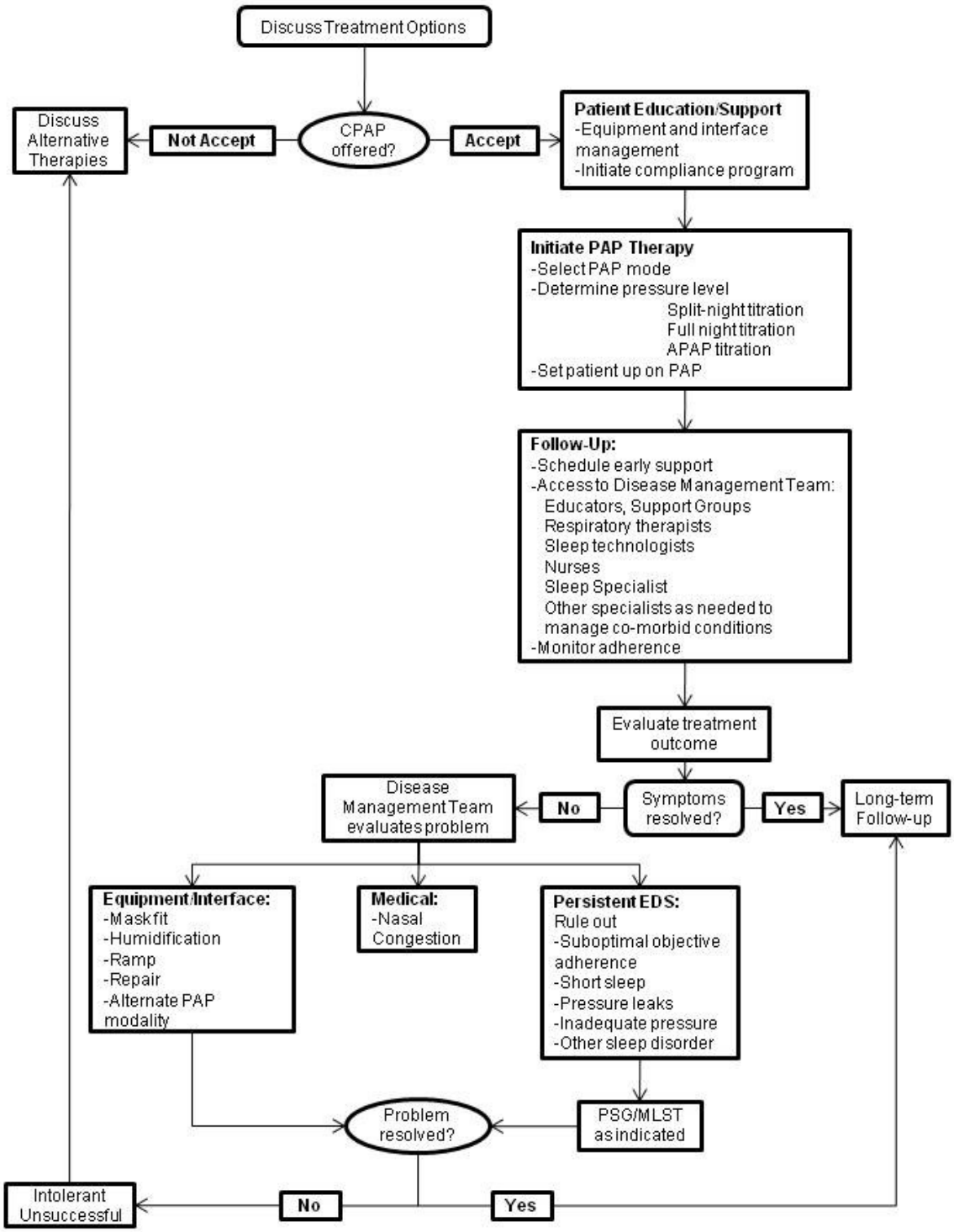


Fig. 6: SRBD Therapy Scheme – CPAP Treatment

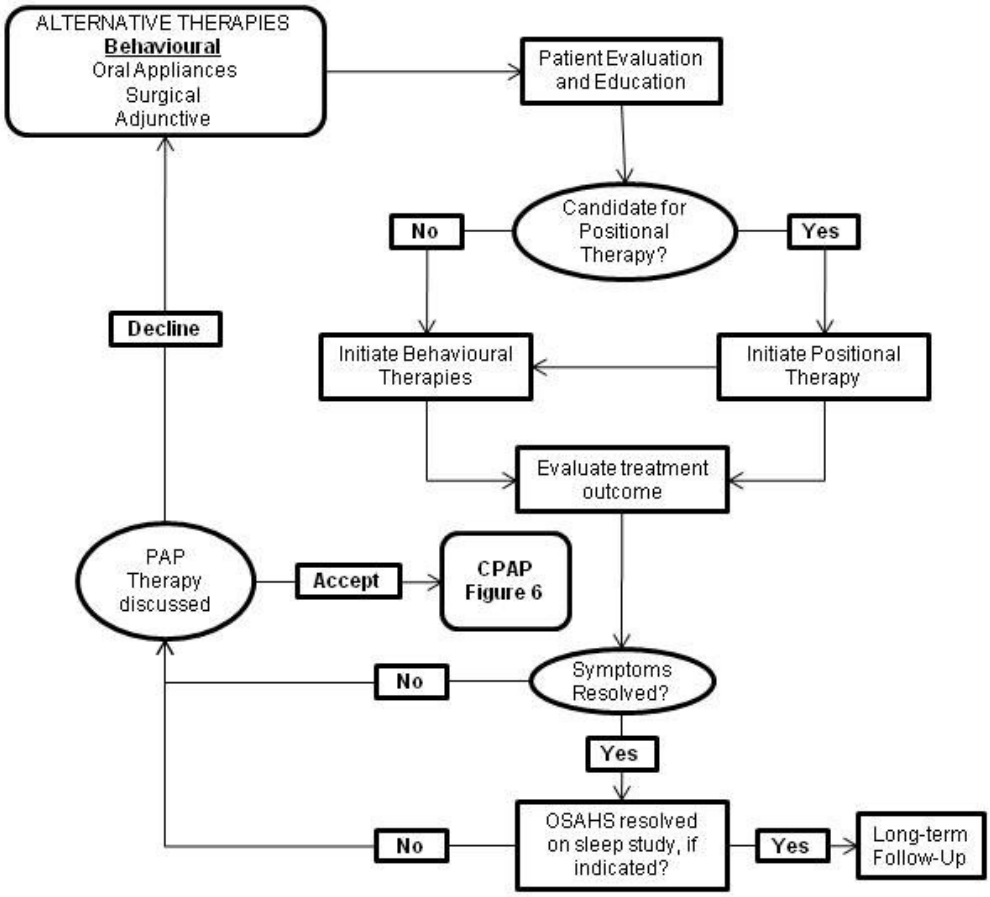


Fig. 7: SRBD Therapy Scheme – Behavioural Treatment

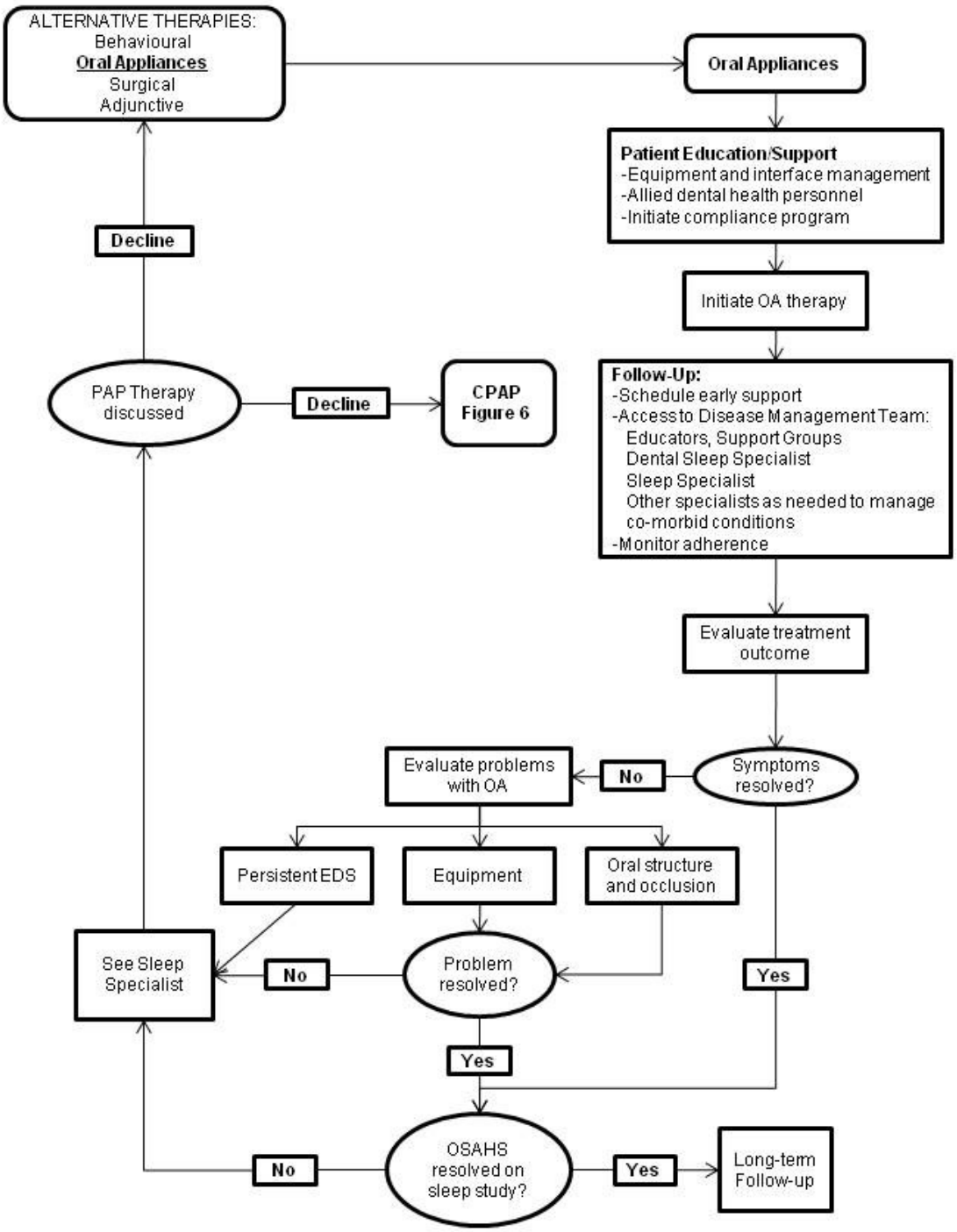


Fig. 8: SRBD Therapy Scheme – Oral Appliances

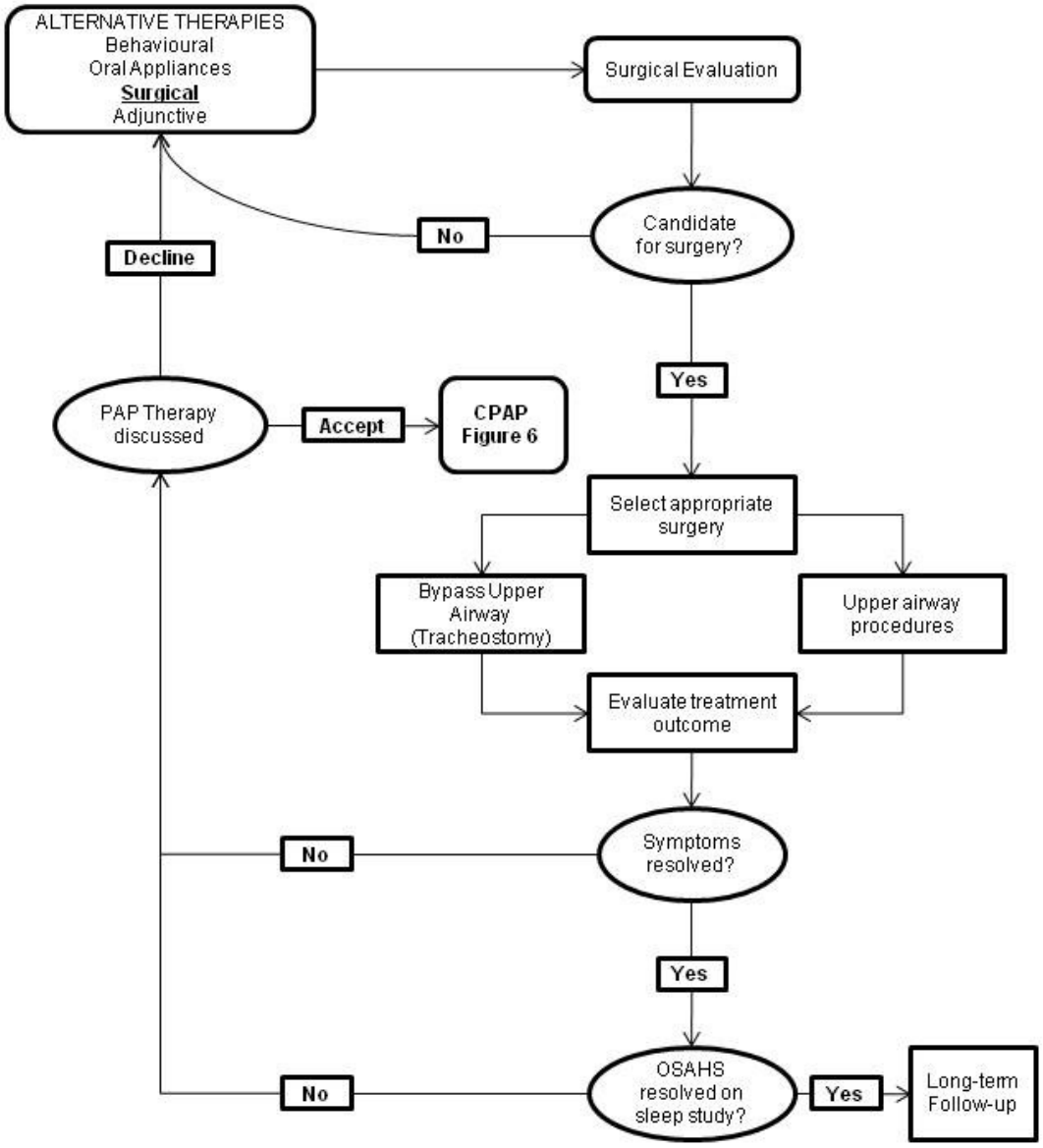


Fig. 9: SRBD Therapy Scheme – Surgical Treatment

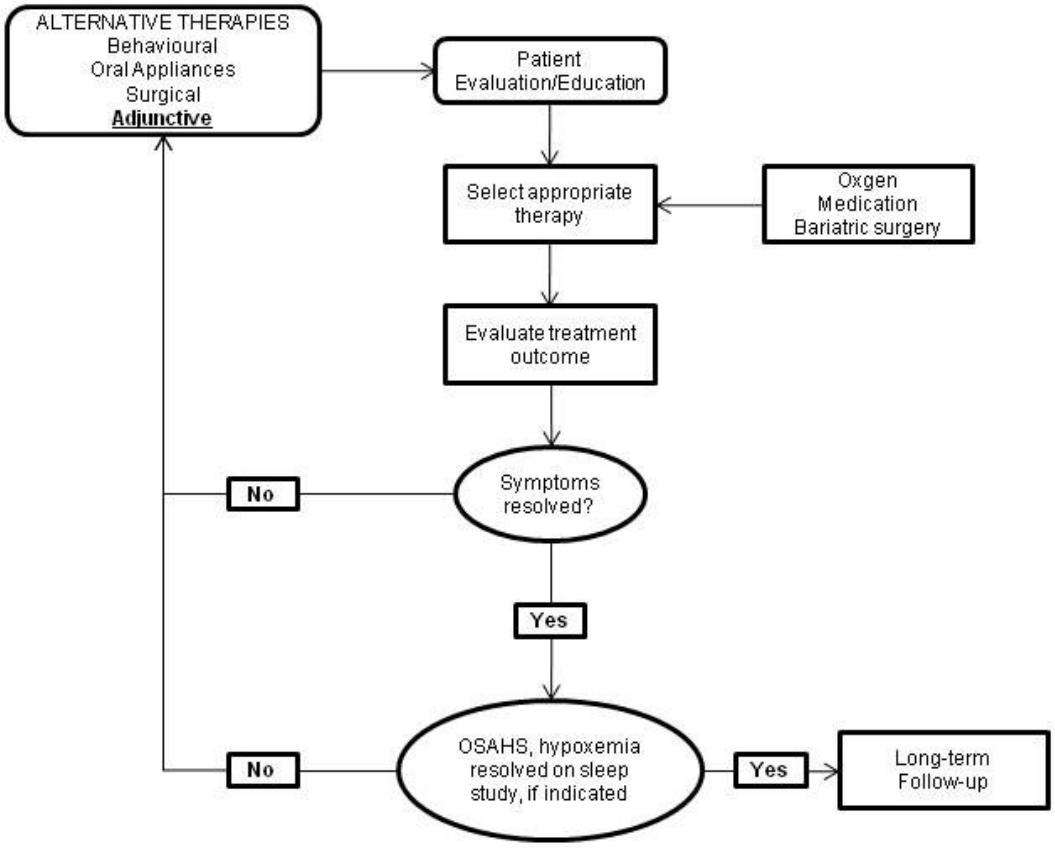


Fig. 10: SRBD Therapy Scheme – Adjunctive Treatment

Metabolic Syndrome

"Metabolic syndrome" (MetS) is an accumulation of components that reflect overnutrition, sedentary lifestyles and resultant excess adiposity. The MetS includes the clustering of abdominal obesity, insulin resistance, dyslipidemia, and elevated blood pressure. Additionally, it is associated with an immense number of other comorbidities. (92)

Epidemiology

The prevalence of the MetS is increasing throughout the world. Available evidence indicates that between 20% and 30% of the adult population can be characterized as having metabolic syndrome in most western countries. In parts of the developing world in which young adults predominate, the percentage is still lower, but with increasing prosperity and aging of the population, the prevalence will undoubtedly rise (93). However, the prevalence estimates of the MetS are dependent on the definition that is used as well as the composition of the population being studied. Differences in genetic background, diet, levels of physical activity, population age, sex structure, levels of over- and undernutrition and body habitus all influence the prevalence of both metabolic syndrome and its components (94). Moreover, lifestyle habits and socioeconomic status appear to influence the prevalence across sex, age and race/ethnicity cohorts. (92)

Definitions

The first formal definition of metabolic syndrome (MetS) was published in 1998 by the World Health Organization (WHO) (95), followed by The European Group for the Study of Insulin Resistance (EGIR) (96), the National Cholesterol Education Program (NCEP:ATPIII) (97), the American Association of Clinical Endocrinologists (AACE) (98) and the International Diabetes Federation (IDF) (99). The different definitions of the MetS are associated with varying risk (100).

Adapted from The Endocrine Society "The Metabolic Syndrome" (92):

Criteria for MetS Definitions

WHO, 1998	EGIR, 1999	NCEP:ATPIII, 2001	AACE, 2003	IDF, 2006
High insulin levels, IFG or IGT, and two of the following:	Top 25% of the fasting insulin values among nondiabetic individuals and two of the following:	Three or more of the following:	IGT and two or more of the following:	Central obesity (WC: ≥94cm for Europid men, ≥80cm for Europid women)** and two of the following:
WHR >0.9, BMI ≥30 kg/m2, WC > 94 cm	WC: ≥94 cm for men, ≥80 cm for women	WC: >102 cm for men, >89 cm for women		
Triglycerides >150 mg/dl	Triglycerides ≥2.0 mmol/liter	Triglycerides ≥150 mg/dl	Triglycerides ≥150 mg/dl	Triglycerides ≥150 mg/dl
HDL-C <35 mg/dl	HDL-C <1.0 mg/dl	HDL-C: <40 mg/dl for men, <50 mg/dl for women	HDL-C: <40 mg/dl for men, <50 mg/dl for women	HDL-C: <40 mg/dl for men, <50 mg/dl for women
BP >140/90 mmHg	BP ≥140/90 mmHg or antihypertensive medication	BP ≥130/85 mmHg	BP ≥130/85 mmHg	BP ≥130/85 mmHg
	Fasting glucose ≥6.1 mmol/liter	FPG ≥110 mg/dl*		FPG ≥100 mg/dl

* In 2003, the American Diabetes Association (ADA) changed the criteria for IFG tolerance from ≥110 mg/dl to ≥100 mg/dl (101)

** WC with ethnicity specific values

WHR, Waist-to-hip ratio; WC, Waist circumference; BP, blood pressure; IGT, impaired glucose tolerance; IFG impaired fasting glucose FPG, fasting plasma glucose.

Tab. 4: MetS Criteria

Pathophysiology

As the term 'syndrome' implies, a single specific causative etiology to MetS is not clear. Nevertheless, abdominal adiposity and insulin resistance appear to be at the core of the pathophysiology of MetS and its individual components. The most accepted and unifying hypothesis to describe the pathophysiology of metabolic syndrome is insulin resistance Excerpt from "The metabolic syndrome" Lancet, 2010 (102):

"Free fatty acids (FFA) are released in abundance from an expanded adipose tissue mass. In the liver, FFA produce an increased production of glucose, triglycerides and secretion of very low density lipoproteins (VLDL). Associated lipid/lipoprotein abnormalities include reductions in high density lipoprotein (HDL) cholesterol and an increased density of low density lipoproteins (LDL). FFA also reduce insulin sensitivity in muscle by inhibiting insulin mediated glucose uptake. Associated defects include a reduction in glucose partitioning to glycogen and increased lipid accumulation in triglyceride (TG). Increases in circulating glucose and to some extent FFA increase pancreatic insulin secretion resulting in hyperinsulinemia. Hyperinsulinaemia may result in enhanced sodium reabsorption and increased sympathetic nervous system activity and contribute to the hypertension as might increased levels of circulating FFA. Superimposed and contributory to the insulin resistance produced by excessive FFA is the paracrine and endocrine effect of the proinflammatory state. Produced by a variety of cells in adipose tissue including adipocytes and monocyte-derived macrophages, the enhanced secretion of interleukin-6 (IL-6) and tumor necrosis factor alpha (TNF-α) among others results in more insulin resistance and lipolysis of adipose tissue triglyceride stores to circulating FFA. IL-6 and other cytokines are also increased in circulation and may enhance hepatic glucose production, the production of VLDL by the liver and insulin resistance in muscle. Cytokines and FFA also increase the production of fibrinogen and plasminogen activator inhibitor-1 (PAI-1) by the liver that complements the overproduction of PAI-1 by adipose tissue. This results in a pro-thrombotic state. Reductions in the production of the anti-inflammatory and insulin sensitizing cytokine adiponectin are also associated with metabolic syndrome and may contribute to the pathophysiology of the syndrome."

Therapy

Currently, no randomized controlled trials have been published to help guide specific recommendations for managing MetS. Due to the fact that it is unclear whether there is a unifying pathophysiological mechanism resulting in MetS, it is unclear whether MetS can be treated in and of itself (92). The primary goal of clinical management of metabolic syndrome is to reduce risk for clinical atherosclerotic disease. A closely related goal is to decrease the risk for type 2 diabetes mellitus in those patients who have not yet manifested clinical diabetes. (103)

All current guidelines on the management of the individual components of metabolic syndrome emphasize that considering lifestyle is first-line therapy. For management of long-term as well as short-term risk, lifestyle therapies (weight loss in overweight or obese subjects, increased physical activity and modification of an atherogenic diet) are first-line interventions to reduce metabolic risk factors. These changes produce a reduction in all of the metabolic risk factors simultaneously. In the long-run, the greatest benefit for those with metabolic syndrome is derived from effective lifestyle intervention. (103)

Adapted from the American Heart Association (AHA) Scientific Statement 'Diagnosis and Management of the Metabolic Syndrome' (103):

Lifestyle Therapy Targets for Prevention of ASCVD or Prevention/Treatment of Type 2 Diabetes

Therapeutic Target and Goals of Therapy	Therapeutic Recommendations
Abdominal obesity Goal: Reduce body weight by 7%–10% during first year of therapy. Continue weight loss thereafter to extent possible with goal to ultimately achieve desirable weight (BMI <25 kg/m2)	Consistently encourage weight maintenance/reduction through appropriate balance of physical activity, caloric intake, and formal behavioural programs when indicated to maintain/achieve waist circumference of <102cm in men and <89cm in women. Aim initially at slow reduction of 7%–10% from baseline weight. Even small amounts of weight loss are associated with significant health benefits.
Physical inactivity Goal: Regular moderate-intensity physical activity; at least 30 min of continuous/intermittent (preferably 60 min) 5 d/wk, but preferably daily	In patients with established CVD, assess risk with detailed physical activity history and/or exercise test, to guide prescription. Encourage 30–60 min moderate-intensity aerobic activity (eg, brisk walking), preferably **daily**, supplemented by increase in daily lifestyle activities (eg, pedometer step tracking, walking breaks at work, gardening, household work). Higher exercise times achieved by accumulating exercise throughout day. Encourage resistance training 2 d/wk. Advise medically supervised programs for high-risk patients (eg, recent acute coronary syndrome or revascularization, CHF).
Atherogenic diet Goal: Reduced intakes of saturated fat, transfat, cholesterol	Recommendations: Saturated fat <7% of total calories; reduce trans fat; dietary cholesterol <200 mg/d; total fat 25%–35% of total calories. Most dietary fat should be unsaturated, simple sugars should be limited.

BMI indicates body mass index; CVD, cardiovascular disease; and CHF, congestive heart failure.

Tab. 5: MetS – Therapeutic Targets

A patient's 10-year risk status, which can be calculated with cardiovascular disease risk assessment models like the ESC (European Society of Cardiology) SCORE risk charts, determines the intensity of therapy for each risk factor (104). No specific drugs are currently recommended for people with metabolic syndrome. Recommendations for drug therapy are based on current guidelines for each risk factor. The following table summarizes the recommended approaches to the management of each of the risk factors of MetS established by the AHA, the National Heart, Lung and Blood Institute (NHLBI) and ADA.

Adapted from the AHA Scientific Statement 'Diagnosis and Management of the Metabolic Syndrome' (103):

Therapy of Metabolic Risk Factors for Prevention of ASCVD or Treatment of Type 2 Diabetes

Therapeutic Target and Goals of Therapy	Therapeutic Recommendations
Atherogenic dyslipidemia	
Primary target: LDL-C Reduce LDL-C levels to ATP III goals (see Therapeutic Recommendations).	For elevated LDL-C: Give priority to reduction of LDL-C over other lipid parameters. Achieve LDL-C goals based on patient's risk category. LDL-C goals for different risk categories are High risk*: <100 mg/dL (optional <70 mg/dL for high-risk patients**) Moderately high risk*** <130 mg/dL (optional <100 mg/dL) Moderate risk°: <130 mg/dL Lower risk°°: <160 mg/dL
Secondary target: Non-HDL-C If TG ≥200 mg/dL, reduce non-HDL-C to ATP III goals (after attaining LDL-C goals; see Therapeutic Recommendations).	If TG ≥200 mg/dL, goal for non–HDL-C for each risk category is 30 mg/dL higher than for LDL-C. If TG ≥200 mg/dL after achieving LDL-C goal, consider additional therapies to attain non-HDL-C goal.
Tertiary target: HDL-C If HDL-C <40 mg/dL in men or <50 mg/dL in women after attaining non-HDL-C goal, raise HDL-C to extent possible with standard therapies for atherogenic dyslipidemia.	For reduced HDL-C: If HDL-C is low after achieving non–HDL-C, either lifestyle therapy can be intensified or drug therapy can be used for raising HDL-C levels, depending on patient's risk category.
Elevated blood pressure	
Reduce BP to at least achieve BP of <140/90 mmHg (or <130/80 mmHg if diabetes is present). Reduce BP further to extent possible through lifestyle changes.	For BP ≥120/80 mmHg: Initiate or maintain lifestyle modification via weight control, increased physical activity, alcohol moderation, sodium reduction, and emphasis on increased consumption of fresh fruits, vegetables, and low-fat dairy products in all patients with metabolic syndrome. For BP ≥140/90 mmHg (or ≥130/80 mmHg if diabetes is present), add BP medication as needed to achieve goal BP.
Elevated glucose	
For IFG, delay progression to type 2 diabetes mellitus. For diabetes, hemoglobin A_{1C} <7.0%.	For IFG, encourage weight reduction and increased physical activity. For type 2 diabetes, lifestyle therapy and pharmacotherapy, if necessary, should be used to achieve near-normal HbA_{1C} (<7%). Modify other risk factors and behaviours (eg, abdominal obesity, physical inactivity, elevated BP, lipid abnormalities).
Prothrombotic state	
Reduce thrombotic and fibrinolytic risk factors	For high-risk patients, initiate and continue low-dose aspirin therapy; in patients with ASCVD, consider clopidogrel if aspirin is contraindicated. For moderately high-risk patients, consider low-dose aspirin prophylaxis.
Proinflammatory state	Recommendations: No specific therapies beyond lifestyle therapies

TG indicates triglycerides; BP, blood pressure; CHD, coronary heart disease; IFG, impaired fasting glucose; and ASCVD, atherosclerotic cardiovascular disease

* High-risk patients have established atherosclerotic CVD, diabetes, or 10-year risk for CHD >20%. For cerebrovascular disease, high-risk conditions include TIA or stroke of carotid origin or >50% carotid stenosis.

** Very high-risk patients are likely to have major CVD events during next few years; diagnosis depends on clinical assessment. Factors that may confer very high risk include recent acute coronary syndromes, and established CHD + multiple major risk factors (especially diabetes), severe and poorly controlled risk factors (especially continued cigarette smoking), and metabolic syndrome.

*** Moderately high-risk patients have 10-year risk for CHD of 10%–20%. Factors favouring therapeutic option of non-HDL-C <100 mg/dL are those that can elevate patients to upper range of moderately high risk: multiple major risk factors, severe and poorly controlled risk factors (especially continued cigarette smoking), metabolic syndrome, and documented advanced subclinical atherosclerotic disease (eg, coronary calcium or carotid intimal-medial thickness >75th percentile for age and sex).

° Moderate-risk patients have ≥2 major risk factors and 10-year risk <10%.

°° Lower-risk patients have 0–1 major risk factor and 10-year risk <10%.

Tab. 6: MetS – CVD Risk Factor Prevention/Therapies

CARDIOVASCULAR RESEARCH: SLEEP APNEA AND THE METABOLIC SYNDROME

Objective and Methods

The aim of the study was to examine parameters of sleep-related breathing disorders (SRBD) for a correlation with parameters of metabolic syndrome (MetS) and to investigate whether sleep specific treatment has an effect on metabolic parameters and the incidence of cardiovascular events.

A retrospective review was conducted on 783 patients referred to the sleep laboratory of the Department for Internal Medicine/Division for Pulmonology at the Medical University Graz, Austria, for evaluation of sleep disorders between September 2006 and November 2009.

Patients were referred for a polysomnography on the basis of clinical indications identified by the patients and their physician in the course of their usual clinical care, or for routine supervision within current treatment. All patients underwent an overnight polysomnography at the sleep laboratory. All sleep studies included an electroencephalogram (C4-A1,C3-A2), an electrooculogram, a submental electromyogram, nasal-oral airflow measurement by thermistor, chest and abdominal wall motion by respiratory strain gauge belts, pulse oximetry, heart rate, an electromyogram of both anterior tibialis muscles, digital video recording, a snoring microphone and body position measurement. Respiratory events and sleep staging were scored based on the rules in the AASM Manual for the Scoring of Sleep and Associated Events (4). Additional measurements included weight and height. Routine blood samples were taken in the morning after the overnight polysomnography. For results from fasting, patients were on a “nil by mouth” diet. To compare SRBD with symptoms of MetS, the following parameters were compiled: Age (yrs), sex, weight (kg), height (cm), body mass index (BMI, kg/m²), levels of high-density lipoprotein cholesterol (HDL, mg/dL), low-density lipoprotein cholesterol (LDL; mg/dL), cholesterol (Chol, mg/dL), C-reactive protein (CRP, mg/L), triglyceride (TG, mg/dL), fasting plasma glucose (FPG, mg/dL), glycosylated hemoglobin (DCCT-HbA1c, %) and the respiratory parameters apnea-hypopnea index (AHI/hour), longest duration of a respiratory event (longest event, seconds) and minimum capillary oxygen saturation level ($minO_2$, %). Furthermore, anamnestic data on account of the existence of diabetes mellitus (DM) and previous cardiovascular events such as myocardial infarction (MI) or apoplexy (APO) were collected.

The study was approved by the ethics commission at the Medical University of Graz.

Statistical Analysis

The patients were divided into SRBD patients (AASM category II, Sleep-Related Breathing Disorders) and others (AASM category I-VIII). Subgroups of the SRBD cohort were formed concerning sex, age, AHI and BMI. The cut-offs for severity of SRBD were defined as AHI less than 15, 15 to 30 and greater than 30 events per hour to determine the presence of mild, moderate or severe sleep apnea. The BMI was defined as less than 18.5 kg/m² (underweight), 18.5 to 25kg/m² (normal) and more than 25kg/m² (overweight). Statistical analyses were performed using the SPSS 17.0 (SPSS, Chicago, IL, USA). The parameters of SRBD were compared with blood parameters related to metabolic syndrome using the Pearson product-moment correlation coefficient. The size of the correlation was defined as none (-0.09 to 0 to 0.09), small (-0.3 to-0.1 and 0.1 to 0.3), medium (-0.5 to -0.3 and 0.3 to 0.5) and large (-0.5 to -1.0 and 0.5 to 1). The Wilcoxon–Mann–Whitney test was used for trend analysis, to examine the parameters of two consultations for significant changes under therapy. When more than two consultations were available, the first and the last visits of each patient were used for the trend analysis. Fisher's exact test was used to examine CVD incidences for significant differences between therapy groups.

Results

783 (male 465; female 318) patients were seen in consultation during the study period. The mean age was 58 (m 57a; f 59a), the mean height 170cm (m 157cm; f 162cm), the mean weight 88,1kg (m 94.1kg; f 79.3kg) and the mean BMI 30.5kg/m² (m 30.6; f 30.3) (table 7-9).

Of these patients, 562 (71.8%; m 372; f 190) were diagnosed with SRBD (AASM II). The mean age was 60 (m 58a; f 63a). 20.8% were younger than the age of 50, 58.2% were between 50-70 years old and 21% were older than 70 years. The mean height was 170cm (m 175cm; f 161cm), the mean weight 92kg (m 97kg; f 81kg) and the mean BMI 31.5 kg/m² (m 31.5; f 31.1). 0.4% had a BMI below 18.5 kg/m², 12.3% had a BMI between 18.5 to 25 kg/m² and 87.2% a BMI higher than 25kg/m². Mean blood levels were: HDL 54 mg/dL (m 54mg/dL; f 59mg/dL), LDL 112 mg/dL (m 110mg/dL; f 115mg/dL), Chol 190mg/dL (m 187mg/dL; f 195mg/dL), CRP 7,2mg/L (m/f 7,2mg/L), TG 153mg/dL (m 161mg/dL; f 138mg/dL), FPG 108mg/dL (m 109mg/dL; f 105mg/dL) and HbA1c 6% (m 6%; f 5.9%).

SRBD parameters were as follows: Mean AHI 25/hour (m 27/h; f 20/h), longest duration of a respiratory event 57 seconds (m 58s; f 54s) and minimum capillary oxygen saturation level 79% (m/f 79%) (table 10). At this first consultation, 46.8% of the AASM II group had an AHI less than 15, 23.3% between 15-30 and 29.9% had an AHI greater than 30 (table 16). These prevalence differed when groups were sorted by sex and age (table 18). Of the entire group of 783 patients (data were not available for 63 patients), 111 patients (15.3%) were found to have diabetes mellitus, 49 patients (6.8%) had a myocardial infarction and 38 patients (5.3%) an apoplexy in their anamneses (table 31). The majority of these events occurred in the AASM II group containing 99 patients with diabetes mellitus (19%; m 71; f 28), 43 cases of myocardial infarction (8.4%; m 37; f 6) and 28 patients with an anamnestic apoplexy (5.5%; m 20; f 8) (table 31).

383 patients of the AASM II group (562 patients) had another monitoring consultation within the study period, which was used for trend analysis and as a measurement of the therapeutic success. The remaining 179 patients did not have another monitoring consultation within the study period, refused therapy or were not in need of further sleep specific therapy. The mean interval between the first and last consultation was 304 days in a range of 1 to 1010 days (table 19). Under therapy, 278 patients (72.6%) improved their AHI to a level below 5 events per hour, which is considered to be good therapeutic success. 82 patients (21.4%) reached an AHI between 5 to 15, considered to be an acceptable outcome and 23 (6%) had an AHI beyond 15 regarded as poor therapeutic success (table 22).

In the group of 360 patients (278 good and 82 acceptable success), as far as data were available, new onset diabetes mellitus occurred in 2.4% (8 patients), myocardial infarction in 1.5% (5 patients) and apoplexy in 0.9% (3 patients) of the patients within the study period (table 20, 32). There were several statistically significant changes in the measured parameters in this group. As to be expected, the respiratory parameters decreased significantly: AHI (-89.2%; $p<0.001$), the mean time of the longest duration of a respiratory event (-37.4%; $p<0.001$) and the mean minimum capillary oxygen saturation level (+13.6%; $p<0.001$) (table 26, 29). In this group, some metabolic parameters also changed significantly. Particularly, the mean weight (+0.7%; $p<0.001$), the mean BMI (+1.5%; $p<0.001$), the mean CRP level (-25%; p 0.001), the mean fasting plasma glucose level (+2.5%; $p<0.001$) and the mean glycosylated hemoglobin level (-1.4%; $p<0.001$) changed (table 26, 29).

In the group of 23 patients, who had poor therapeutic success, 5% (1 patient) had a new onset of diabetes mellitus, 9.5% (2 patients) had a myocardial infarction and no apoplectic events took place during the study period (table 21, 31). There were no statistically significant changes in respiratory and metabolic parameters in this group (table 27, 30).

A trend towards fewer events of myocardial infarction under therapy occurred (table 32). Still, there were no significant differences in cardiovascular incidences between the good/acceptable group and the group with poor therapeutic success before and within the study period (table 31-32).

In the first measurement of the AASM II group (562 patients) several significant correlations were found. Medium correlations among metabolic and respiratory parameters were found between AHI/weight (0.373; $p<0.001$), AHI/BMI (0.367; $p<0.001$), $minO_2$/weight (-0.326; $p<0.001$) and $minO_2$/BMI (-0.387; $p<0.001$) (table 33).

Large correlations in respiratory parameters were only found between $minO_2$/AHI (-0.574; $p<0.001$). Medium correlations in respiratory parameters were found between $minO_2$/longest event (-0.327; $p<0.001$). Large correlations in metabolic parameters were found between BMI/weight (0.878; $p<0.001$), Chol/LDL (0.869; $p<0.001$), FPG/DM (0.568; $p<0.001$), HbA1c/DM (0.643; $p<0.001$) and HbA1c/FPG (0.731; $p<0.001$). Medium correlations in metabolic parameters were found between height/age (-0.372; $p<0.001$), weight/height (0.464; $p<0.001$), Chol/HDL (0.344; $p<0.001$), TG/HDL (-0.415; $p<0.001$) and FPG/ BMI (0.318; $p<0.001$). A greater number of small correlations was also found (table 33).

After adjustment for multiple categories, such as sex, age, BMI and AHI, most of the correlations lost significance except for $minO_2$/weight, $minO_2$/BMI, $minO_2$/AHI, BMI/weight, Chol/LDL, TG/HDL, FPG/DM, HbA1c/DM, and HbA1c/FPG (table 33-46).

Discussion

Previous studies have demonstrated that SRBD are an independent risk factor for cardiovascular events (105), such as myocardial infarctions (106) and apoplexy (107).

Hospital release data in Austria show an MI incidence of about 0.2% per year (108). Thus, the overall incidence of 1.5% in the successful therapy group (360 patients, an average of 304 days in therapy) seems to be considerably higher than the yearly incidence in Austria. Since our data were obtained from a risk population only, incidence rates cannot be compared with those of the general population. Still, the MI incidence under therapy in patients with poor therapeutic success (9.5%) appears to be even higher than in patients who have an acceptable/good therapy outcome (1.5%) but after statistical testing this difference was shown to be not significant.

In contrast to another study (109), initial SRBD severity (AHI, $minO_2$) did not correlate with cardiovascular incidences in our study.

An association between SRBD and symptoms of the metabolic syndrome such as insulin resistance/impaired glucose tolerance (69, 110) and dyslipidemia (111, 112) has also been shown in previous studies. Apart from correlations between $minO_2$ and BMI or weight, no other correlations between metabolic and respiratory parameters were found in this study. Nevertheless, an increase of the mean FPG level (+2.7mg/dL; +2.5%; $p<0.001$), and a small decrease of the mean HbA1c level (-0.1;-1.4%; $p<0.001$) occurred after successful SRBD specific treatment.

Furthermore, correlations between SRBD and inflammatory parameters, such as higher C-reactive protein levels (113, 114) are mentioned in literature. Despite a lack of significant correlation between respiratory or metabolic parameters and C-reactive protein levels before treatment, a significant mean CRP level reduction (-1.8mg/L; -25%; p0.001) appeared after successful therapy (360 patients). This reduction does not appear to have any association to the other metabolic parameters, as these, except for a small mean HbA1c decrease, did not show a significant difference after therapy. Moreover, a mean CRP level increase (+0.4mg/L; +4.5%; p0.444) in the poor success group (23 patients) appeared after therapy. Therefore, significant changes in CRP levels in the good/acceptable group may be due to SRBD specific treatment.

Limitations

In this study, the diagnosis of AASM II did not distinguish between OSAHS, CSAHS or other sleep related breathing disorders. Hence, although patients with OSAHS should have provided the majority of all cases, potential differences between SRBD subgroups remain undiscovered in our results.

Specific anti-inflammatory, hyperglycaemic and hyperlipidaemic therapies as well as dietary and lifestyle modifications or changes during the observation period were not taken into account for their influence on the measured parameters in our study. Additionally, changes in sleep specific therapy (positional therapy, PAP, ASV) were not analysed.

Other inflammation markers, such as total lymphocytes, CD4+ cells, TNF-alpha, IL-6, nuclear factor-κB and uric acid levels, known to be associated with OSAHS (67, 68), were not measured in this study.

Due to the smaller group of patients without successful treatment (23 patients) and the fact that both cardiovascular events took place only two weeks after study entry, there is little evidence explaining CVD incidence just on the basis of their low therapeutic success. Furthermore, changes in the cardiovascular status were only recorded from “no cardiovascular event in the medical history” to “a cardiovascular event took place”.
Thus, additional cardiovascular events were not included and therefore present a possible statistical bias. Moreover, the period of observation may have been too short to evaluate long-term treatment effects on cardiovascular events, such as myocardial infarction or apoplexy.

Conclusion

In this study, positive airway pressure and related devices with an overall success rate of 94% (good and acceptable success, AHI<15) seem to be an adequate symptomatic treatment option for SRBD patients. Still, the therapeutic success regarding MetS is low considering a significant increase in the mean weight, BMI, FPG levels and an increased rate of cardiovascular events in comparison to the mean incidence in Austria. A trend towards fewer events of myocardial infarction was found under therapy; however, no significant differences in cardiovascular incidences occurred between the good/acceptable therapy success group and the poor therapy success group before and under sleep specific treatment.
The fact that CRP level decreased after successful SRBD specific treatment, suggests that SRBD may induce a systemic inflammatory state.

Therefore, the collected data strongly suggest that patients with MetS and SRBD require multimodal therapy. This therapy has to contain PAP, medical therapy, lifestyle modifications and, in some cases, even surgical treatment to successfully reduce both, metabolic and respiratory parameters and thus further decrease cardiovascular morbidity and mortality.

Further studies are needed, including long-term follow-up, more parameters, a larger cohort of non-responders and a control group of patients without SRBD to receive more significant statistical data.

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Appendix

Tab. 7: Frequency 1.Measurement in Total (783 patients)

		Age	Height	Weight	BMI	DM	MI	Apoplexy	HDL	LDL	Chol	CRP	TG	FPG	HBA1c	AHI	Longest Event	$minO_2$
N	Valid	783	783	783	783	724	724	720	723	642	763	757	762	731	633	783	779	779
	Missing	0	0	0	0	59	59	63	60	141	20	26	21	52	150	0	4	4
Mean		58,07	169,945	88,124	30,456				54,61	111,36	190,44	6,967	146,8	104,94	6,594	17,941	48,32	81,56
Median		58,08	170	85,5	29,38				52	110,5	189	2,8	129	97	5,6	9,1	43,8	83,9
Deviation		13,28	9,5358	21,114	6,674				17,394	31,543	40,314	16,4356	78,193	27,513	11,8663	21,9109	31,062	9,43
Minimum		18	120	43	16,3				18	23	80	0,6	28	6	0,1	0	0	50,9
Maximum		88	192	226	73,8				150	218	307	230	527	237	279	117,9	196	97,9
Total						111	49	38										

Tab. 8: Frequency 1.Measurement All Diagnoses Male

		Age	Height	Weight	BMI	DM	MI	Apoplexy	HDL	LDL	Chol	CRP	TG	FPG	HBA1c	AHI	Longest Event	$minO_2$
N	Valid	465	465	465	465	431	426	425	432	376	451	446	449	431	377	465	463	462
	Missing	0	0	0	0	34	39	40	33	89	14	19	16	34	88	0	2	3
Mean		56,94	175,374	94,135	30,594				51,65	109,11	186,8	7,185	151,86	106,6	6,031	21,629	51,52	80,752
Median		57,56	176	91	29,41				49	109,5	184	2,5	136	99	5,6	13,9	47,1	82,9
Deviation		13,269	7,07	20,3981	6,3933				17,166	32,465	40,383	18,3091	80,406	27,556	3,1042	22,8973	31,204	9,479
Minimum		21	140	43	16,3				18	23	80	0,6	28	54	2,3	0	0	50,9
Maximum		87	192	226	73,8				150	218	302	230	518	237	63	117,9	187	94,9
Total						72	37	24										

Tab. 9: Frequency 1.Measurement All Diagnoses Female

	Age	Height	Weight	BMI	DM	MI	Apoplexy	HDL	LDL	Chol	CRP	TG	FPG	HBA1c	AHI	Longest Event	$minO_2$
N Valid	318	318	318	318	293	298	295	291	266	312	311	313	300	256	318	316	317
Missing	0	0	0	0	25	20	23	27	52	6	7	5	18	62	0	2	1
Mean	59,72	162,006	79,334	30,256				59	114,53	195,69	6,653	139,55	102,56	7,422	12,548	43,64	82,737
Median	59,3	162	76	29,175				58	111,5	194	3,2	124	93	5,7	4,2	39,3	84,9
Deviation	13,145	6,6854	18,9786	7,0699				16,818	29,967	39,693	13,3189	74,433	27,321	18,2653	19,1776	30,297	9,2473
Minimum	18	120	45	17,2				23	46	100	0,6	38	6	0,1	0	0	50,9
Maximum	88	187	170	63,2				112	201	307	186,7	527	236	279	110,5	196	97,9
Total					39	12	14										

Tab. 10: Frequency 1.Measurement AASM II in Total (562 patients)

	Age	Height	Weight	BMI	DM	MI	Apoplexy	HDL	LDL	Chol	CRP	TG	FPG	HBA1c	AHI	Longest Event	$minO_2$
N Valid	562	562	562	562	521	512	511	518	457	545	541	546	522	448	562	560	557
Missing	0	0	0	0	41	50	51	44	105	17	21	16	40	114	0	2	5
Mean	59,88	170,315	91,617	31,495	0,19	0,08	0,05	53,62	111,53	190,04	7,23	153,19	107,62	5,954	24,888	56,54	78,687
Median	59,97	170	89	30,465				50	112	189	3,1	133,5	99	5,7	16,55	50,85	80,9
Deviation	12,19	9,4357	21,3908	6,5824				18,331	31,998	40,407	16,5373	78,696	27,667	0,992	22,8051	30,193	9,3252
Minimum	21	140	43	16,3				18	24	84	0,6	28	54	0,1	0	0	50,9
Maximum	88	192	226	73,8				150	218	302	230	518	237	11,2	117,9	196	91,9
Total					99	43	28										

Tab. 11: Frequency 1.Measurement AASM II Male

	Age	Height	Weight	BMI	DM	MI	Apoplexy	HDL	LDL	Chol	CRP	TG	FPG	HBA1c	AHI	Longest Event	$minO_2$
N Valid	372	372	372	372	346	339	339	347	300	360	357	360	343	301	372	371	369
Missing	0	0	0	0	26	33	33	25	72	12	15	12	29	71	0	1	3
Mean	58,36	174,952	97,151	31,71	0,21	0,11	0,06	50,99	109,79	187,37	7,248	161,06	108,85	5,978	27,223	57,63	78,537
Median	58,37	175	95	30,475				47	110	184	3	141	101	5,7	19,9	51,9	80,9
Deviation	12,199	7,1614	20,8171	6,4612				17,27	33,327	40,429	16,9062	83,006	27,462	0,9948	23,0702	30,264	9,3648
Minimum	21	140	43	16,3				18	24	84	0,6	28	54	4,4	0	0	50,9
Maximum	87	192	226	73,8				150	218	302	230	518	237	11,2	117,9	187	91,9
Total					71	37	20										

Tab. 12: Frequency 1.Measurement AASM II Female

	Age	Height	Weight	BMI	DM	MI	Apoplexy	HDL	LDL	Chol	CRP	TG	FPG	HBA1c	AHI	Longest Event	$minO_2$
N Valid	190	190	190	190	175	173	172	171	157	185	184	186	179	147	190	189	188
Missing	0	0	0	0	15	17	18	19	33	5	6	4	11	43	0	1	2
Mean	62,85	161,237	80,781	31,072	0,16	0,03	0,05	58,95	114,87	195,23	7,196	137,95	105,28	5,905	20,318	54,41	78,982
Median	64,38	161	80	30,38				57	115	196	3,85	125	96	5,7	12	50	81,9
Deviation	11,639	6,1997	18,1439	6,8108				19,292	29,102	39,964	15,8421	67,231	27,985	0,9878	21,6155	30,02	9,2649
Minimum	29	146	45	17,2				19	45	89	0,8	38	68	0,1	0	0	50,9
Maximum	88	187	156	63,3				126	176	287	186,7	517	233	10,7	110,5	196	91,9
Total					28	6	8										

Tab. 13: 1.Measurement AASM II Good/Acceptable Success in Total (360 patients)

	Age	Height	Weight	BMI	DM	MI	Apoplexy	HDL	LDL	Chol	CRP	TG	FPG	HBA1c	AHI	Longest Event	$minO_2$
N Valid	360	360	360	360	339	336	335	335	297	351	346	350	338	294	360	358	359
Missing																	
Mean	59,73	170,64	93,781	32,131				53,19	110,32	188,6	7,167	150,49	108,25	5,983	29,084	59,86	77,254
Deviation	11,559	9,091	21,5937	6,6127				18,389	31,592	38,803	18,0902	77,88	28,767	1,041	23,3601	30,547	9,4759
Minimum	21	148	45,5	19				23	24	97	.9	38	60	.1	.0	0	50,9
Maximum	84	192	226	73,8				146	218	302	230	518	237	11,2	117,9	187	91,9
Total					68	34	21										

Tab. 14: 1.Measurement AASM II No Success in Total

	Age	Height	Weight	BMI	DM	MI	Apoplexy	HDL	LDL	Chol	CRP	TG	FPG	HBA1c	AHI	Longest Event	$minO_2$
N Valid	23	23	23	23	22	21	21	22	14	22	22	22	20	17	23	23	22
Missing																	
Mean	62,92	170,83	92,522	31,733				52,95	110	184,95	8,623	155,77	102,6	5,953	40,291	67,6	77,718
Deviation	12,595	9,203	21,8546	6,8736				18,476	35,431	44,273	14,1122	106,824	19,816	.9362	29,7509	34,571	10,1025
Minimum	31	155	60	18,5				31	61	118	1	52	76	4,4	2,2	18	51,9
Maximum	87	190	145	43,9				111	181	285	64,6	456	155	8,6	101	163	88,9
Total					3	2	2										

Tab. 15: 1.Measurement AASM II in Total sorted by Age

		N	Percentage	Valid Percentage
Valid	< 50y	117	20,8	20,8
	50 - 70y	327	58,2	58,2
	> 70y	118	21	21
	Total	562	100	100

Tab. 16: 1.Measurement AASM II in Total sorted by AHI

		N	Percentage	Valid Percentage
Valid	< 15/h	263	46,8	46,8
	15 – 30/h	131	23,3	23,3
	> 30/h	168	29,9	29,9
	Total	562	100	100

Tab. 17: 1.Measurement AASM II in Total sorted by BMI

		N	Percentage	Valid Percentage
Valid	< 18,5	2	0,4	0,4
	18,5 - 25	69	12,3	12,3
	> 25	490	87,2	87,3
	Total	561	99,8	100
Missing		1	0,2	
Total		562	100	

Tab. 18: 1.Measurement AASM II sorted by Sex/Age/AHI

Tab. 19: 1.-2.Measurement AASM II in Total Days in Therapy

383 patients	Days
Minimum	1
Maximum	1010
Mean	304

Tab. 20: 1.-2.Measurement AASM II Good/Acceptable Success Days in Therapy

360 patients	Days
Minimum	1
Maximum	1010
Mean	310

Tab. 21: 1.-2.Measurement AASM II No Success Days in Therapy

23 patients	Days
Minimum	1
Maximum	695
Mean	211

Tab. 22: 2.Measurement AASM II Therapy Success in Total

		N	Percentage	Valid Percentage
Valid	AHI <5 good	278	72,6	72,6
	AHI 5-15 acceptable	82	21,4	21,4
	AHI >15 no success	23	6	6
	Total	383	100	100

Tab. 23: 2.Measurement AASM II Therapy Success Female

		N	Percentage	Valid Percentage
Valid	AHI <5 good	78	72,2	72,2
	AHI 5-15 acceptable	24	22,2	22,2
	AHI >15 no success	6	5,6	5,6
	Total	108	100	100

Tab. 24: 2.Measurement AASM II Therapy Success Male

		N	Percentage	Valid Percentage
Valid	AHI <5 good	200	72,7	72,7
	AHI 5-15 acceptable	58	21,1	21,1
	AHI >15 no success	17	6,2	6,2
	Total	275	100	100

Tab. 25: 1.-2.Measurement AASM II Therapy in Total

	N	Age	Height	Weight	BMI	HDL	LDL	Chol	CRP	TG	FPG	HbA1c	AHI	Longest Event	min.O2
1.Measurement	383	59,9	170,7	93,7	32,1	53,2	110,3	188,4	7,3	150,8	107,9	6	29,8	60,3	77,3
Deviation		11,63	9,09	21,58	6,62	18,37	31,71	39,09	17,86	79,71	28,35	1,03	23,89	30,81	9,5
2.Measurement	383	60,7	170,2	94,5	32,6	53,7	113,7	190	5,6	161,6	110,6	5,9	4,5	39,2	87,4
Deviation		11,68	9,61	21,92	7,01	19,25	31,82	41,69	9,7	105,86	31,12	0,98	7,38	36,89	6,25
Difference	0	0,8	-0,5	0,8	0,5	0,5	3,4	1,7	-1,7	10,8	2,7	-0,1	-25,2	-21,1	10,1
Percentage		1,34%	-0,29%	0,85%	1,56%	0,94%	3,08%	0,90%	-23,29%	7,16%	2,50%	-1,67%	-84,56%	-34,99%	13,07%

*Significance see table 28

Tab. 26: 1.-2.Measurement AASM II Therapy Good/Acceptable Success

	N	Age	Height	Weight	BMI	HDL	LDL	Chol	CRP	TG	FPG	HbA1c	AHI	Longest Event	min.O2
1.Measurement	360	59,7	170,6	93,8	32,1	53,2	110,3	188,6	7,2	150,5	108,2	6,0	29,1	59,9	77,3
Deviation		11,56	9,09	21,59	6,61	18,39	31,59	38,8	18,09	77,88	28,77	1,04	23,36	30,55	9,48
2.Measurement	360	60,6	170,1	94,5	32,6	53,6	114,0	190,7	5,4	162,1	110,9	5,9	3,1	37,5	87,7
Deviation		11,61	9,64	21,66	6,93	18,82	32,03	41,73	9,01	105,52	31,25	0,97	3,66	35,81	5,91
Difference*		0,8	-0,5	0,7	0,5	0,4	3,7	2,1	-1,8	11,6	2,7	-0,1	-26,0	-22,4	10,5
Percentage		1,40%	-0,30%	0,74%	1,50%	0,78%	3,37%	1,12%	-25,02%	7,73%	2,45%	-1,38%	-89,23%	-37,43%	13,56%

*Significance see table 29

Tab 27: 1.-2.Measurement AASM II Therapy No Success

	N	Age	Height	Weight	BMI	HDL	LDL	Chol	CRP	TG	FPG	HbA1c	AHI	Longest Event	min.O2
1.Measurement	23	62,92	170,83	92,52	31,73	52,95	110,00	184,95	8,62	155,77	102,60	5,95	40,29	67,60	77,72
		12,6	9,2	21,85	6,87	18,48	35,43	44,27	14,11	106,82	19,82	0,94	29,75	34,57	10,1
2.Measurement	23	63,50	170,52	94,28	32,39	55,10	106,15	179,52	9,01	153,43	106,43	6,01	26,37	67,06	81,51
		12,6	9,31	26,1	8,2	25,72	26,94	40,55	16,99	113,55	29,38	1,27	14,01	42,86	8,38
Difference*		0,58	-0,30	1,76	0,65	2,14	-3,85	-5,43	0,39	-2,34	3,83	0,05	-13,92	-0,54	3,79
Percentage		0,92%	-0,18%	1,90%	2,06%	4,04%	-3,50%	-2,94%	4,53%	-1,50%	3,73%	0,90%	-34,55%	-0,80%	4,88%

*Significance see table 30

Tab. 28: 1.-2.Measurement AASM II Therapy in Total Wilcoxon Test

	BMI2 - BMI	HDL2 - HDL	LDL2 - LDL	Chol2 - Chol	CRP2 - CRP	TG2 - TG	FPG2 - FPG	HBA1c2 - HBA1c	AHI2 - AHI	Longest Event2 - Longest Event	$minO_2$2 – $minO_2$
Z	-4.602[b]	-1.485[b]	-.842[b]	-1.418[b]	-3.040[a]	-1.949[b]	-3.626[b]	-5.051[a]	-16.063[a]	-10.297[a]	-15.412[b]
Asymp. Sig. (2-tailed)	<.001	0.138	0.4	0.156	0.002	0.051	<.001	<.001	<.001	<.001	<.001

a. Based on positive ranks.

b. Based on negative ranks.

Tab. 29: 1.-2.Measurement AASM II Therapy Good/Acceptable Success Wilcoxon Test

	Weight2 - Weight	BMI2 - BMI	HDL2 - HDL	LDL2 - LDL	Chol2 - Chol	CRP2 - CRP	TG2 - TG	FPG2 - FPG	HBA1c2 - HBA1c	AHI2 - AHI	Longest Event2 - Longest Event	$minO_2$2 – $minO_2$
Z	-3.684[b]	-4.533[b]	-1.426[b]	-.812[b]	-1.224[b]	-3.340[a]	-1.836[b]	-3.482[b]	-5.074[a]	-16.087[a]	-10.371[a]	-15.202[b]
Asymp. Sig. (2-tailed)	<.001	<.001	.154	.417	.221	.001	.066	<.001	<.001	<.001	<.001	<.001

a. Based on positive ranks.

b. Based on negative ranks.

Tab. 30: 1.-2.Measurement AASM II Therapy No Success Wilcoxon Test

	Weight2 - Weight	BMI2 - BMI	HDL2 - HDL	LDL2 - LDL	Chol2 - Chol	CRP2 - CRP	TG2 - TG	FPG2 - FPG	HBA1c2 - HBA1c	AHI2 - AHI	Longest Event2 - Longest Event	minO22 - minO2
Z	-.625[b]	-.686[b]	-.374[b]	.000[c]	-1.008[b]	-.766[b]	-.805[b]	-1.113[b]	-.511[a]	-1.186[a]	-.639[a]	-1.584[b]
Asymp. Sig. (2-tailed)	.532	.492	.708	1.000	.313	.444	.421	.266	.609	.235	.523	.113

a. Based on positive ranks.

b. Based on negative ranks.

c. The sum of negative ranks equals the sum of positive ranks.

Tab. 31: 1.Measurement All Diagnoses/ASSM II CV Events in Total

Group (N)	N (valid)	DM	DM (%)*	N (valid)	MI	MI (%)*	N (valid)	Apoplexy	Apo (%)*
Total (783)	724	111	15,3%	724	49	6,8%	720	38	5,3%
AASMII (562)	521	99	19,0%	512	43	8,4%	511	28	5,5%
Good/Acceptable Success (360)	339	68	20,1%	336	34	10,1%	335	21	6,3%
No Success (23)	22	3	13,6%	21	2	9,5%	21	2	9,5%
Fisher's Exact Test	Difference in CV Events Good/Acceptable Success & No Success								
Exact Sig. (2-sided)		DM	p 0.588		MI	p 1.000		Apoplexy	p 0.636

* % of N (valid)

Tab. 32: 1.-2.Measurement AASM II CV Events under Therapy in Total

Group (N)	N (valid)	DM	DM (%)*	N (valid)	MI	MI (%)*	N (valid)	Apoplexy	Apo (%)*
AASM II (383)	353	9	2,5%	353	7	2,0%	351	3	0,9%
Good/acceptable Success (360)	333	8	2,4%	332	5	1,5%	330	3	0,9%
No Success (23)	20	1	5,0%	21	2	9,5%	21	0	0,0%
Fisher's Exact Test	Difference in CV Events Good/Acceptable Success & No Success								
Exact Sig. (2-sided)		DM	p 0.412		MI	p 0.059		Apoplexy	p 1.000

* % of N (valid)

Tab. 33: Correlation 1.Measurement AASM II in total

		Age	Height	Weight	BMI	DM	MI	Apoplexy	HDL	LDL	Chol	CRP	TG	FPG	HBA1c	AHI	Longest Event	$minO_2$
Age	Pearson Correlation	1	-,372**	-,278**	-,118**	,154**	,227**	,108*	,092*	-,176**	-,186**	-0,034	-,161**	,102*	,150**	-0,026	0,081	-0,071
	Sig. (2-tailed)		<0,001	<0,001	0,005	<0,001	<0,001	0,014	0,036	<0,001	<0,001	0,426	<0,001	0,02	0,001	0,546	0,054	0,094
	N	562	562	562	562	521	512	511	518	457	545	541	546	522	448	562	560	557
Height	Pearson Correlation	-,372**	1	,464**	-0,006	-0,066	0,01	-0,027	-,173**	-0,032	-0,029	0,016	,150**	-0,052	-0,091	,091*	0,036	0,034
	Sig. (2-tailed)	<0,001		<0,001	0,882	0,132	0,828	0,536	<0,001	0,492	0,499	0,71	<0,001	0,232	0,054	0,03	0,398	0,423
	N	562	562	562	562	521	512	511	518	457	545	541	546	522	448	562	560	557
Weight	Pearson Correlation	-,278**	,464**	1	,878**	,183**	0,036	0,026	-,256**	-0,056	-0,033	0,027	,231**	,261**	,186**	,373**	0,072	-,326**
	Sig. (2-tailed)	<0,001	<0,001		<0,001	<0,001	0,415	0,553	<0,001	0,228	0,443	0,532	<0,001	<0,001	<0,001	<0,001	0,089	<0,001
	N	562	562	562	562	521	512	511	518	457	545	541	546	522	448	562	560	557
BMI	Pearson Correlation	-,118**	-0,006	,878**	1	,233**	0,03	0,048	-,193**	-0,044	-0,018	0,028	,184**	,318**	,251**	,367**	0,067	-,387**
	Sig. (2-tailed)	0,005	0,882	<0,001		<0,001	0,5	0,277	<0,001	0,349	0,667	0,516	<0,001	<0,001	<0,001	<0,001	0,111	<0,001
	N	562	562	562	562	521	512	511	518	457	545	541	546	522	448	562	560	557
DM	Pearson Correlationn	,154**	-0,066	,183**	,233**	1	0,05	,115**	-0,048	-,220**	-,189**	0,002	0,05	,568**	,643**	0,037	0,017	-,088*
	Sig. (2-tailed)	<0,001	0,132	<0,001	<0,001		0,257	0,009	0,285	<0,001	<0,001	0,965	0,26	<0,001	<0,001	0,403	0,697	0,046
	N	521	521	521	521	521	509	510	493	433	511	507	512	495	435	521	519	517
MI	Pearson Correlation	,227**	0,01	0,036	0,03	0,05	1	0,027	-0,057	-,215**	-,208**	0,005	0,042	0,084	,101*	,114**	-0,007	-0,027
	Sig. (2-tailed)	<0,001	0,828	0,415	0,5	0,257		0,55	0,207	<0,001	<0,001	0,907	0,349	0,063	0,037	0,01	0,871	0,536
	N	512	512	512	512	509	512	509	484	424	502	498	502	489	431	512	510	508
Apoplexy	Pearson Correlation	,108*	-0,027	0,026	0,048	,115**	0,027	1	-0,063	-,122**	-,103*	0,029	0,028	,131**	,117*	0,019	,145**	-,093*
	Sig. (2-tailed)	0,014	0,536	0,553	0,277	0,009	0,55		0,164	0,012	0,021	0,525	0,529	0,004	0,015	0,674	0,001	0,037
	N	511	511	511	511	510	509	511	484	424	502	497	502	489	432	511	509	507
HDL	Pearson Correlation	,092*	-,173**	-,256**	-,193**	-0,048	-0,057	-0,063	1	0,064	,344**	-0,05	-,415**	-,131**	-,151**	-,155**	0,034	0,053
	Sig. (2-tailed)	0,036	<0,001	<0,001	<0,001	0,285	0,207	0,164		0,174	<0,001	0,264	<0,001	0,004	0,001	<0,001	0,436	0,231
	N	518	518	518	518	493	484	484	518	457	517	508	517	493	443	518	516	514
LDL	Pearson Correlation	-,176**	-0,032	-0,056	-0,044	-,220**	-,215**	-,122**	0,064	1	,869**	0,023	0,008	-,166**	-,167**	0,032	0,036	-0,004
	Sig. (2-tailed)	<0,001	0,492	0,228	0,349	<0,001	<0,001	0,012	0,174		<0,001	0,631	0,859	0,001	0,001	0,501	0,442	0,93
	N	457	457	457	457	433	424	424	457	457	456	449	456	433	390	457	455	453
Chol	Pearson Correlation	-,186**	-0,029	-0,033	-0,018	-,189**	-,208**	-,103*	,344**	,869**	1	-0,016	,226**	-0,082	-,152**	0,007	0,061	-0,014
	Sig. (2-tailed)	<0,001	0,499	0,443	0,667	<0,001	<0,001	0,021	<0,001	<0,001		0,713	<0,001	0,064	0,001	0,874	0,155	0,75
	N	545	545	545	545	511	502	502	517	456	545	534	544	515	445	545	543	540
CRP	Pearson Correlation	-0,034	0,016	0,027	0,028	0,002	0,005	0,029	-0,05	0,023	-0,016	1	0,023	0,051	0,024	0,029	-0,047	-0,058
	Sig. (2-tailed)	0,426	0,71	0,532	0,516	0,965	0,907	0,525	0,264	0,631	0,713		0,602	0,245	0,618	0,498	0,28	0,177
	N	541	541	541	541	507	498	497	508	449	534	541	535	519	439	541	539	536
TG	Pearson Correlation	-,161**	,150**	,231**	,184**	0,05	0,042	0,028	-,415**	0,008	,226**	0,023	1	,171**	,105*	,098*	-0,023	-0,039
	Sig. (2-tailed)	<0,001	<0,001	<0,001	<0,001	0,26	0,349	0,529	<0,001	0,859	<0,001	0,602		<0,001	0,027	0,021	0,591	0,359
	N	546	546	546	546	512	502	502	517	456	544	535	546	516	445	546	544	541
FPG	Pearson Correlation	,102*	-0,052	,261**	,318**	,568**	0,084	,131**	-,131**	-,166**	-0,082	0,051	,171**	1	,731**	,172**	0	-,166**
	Sig. (2-tailed)	0,02	0,232	<0,001	<0,001	<0,001	0,063	0,004	0,004	0,001	0,064	0,245	<0,001		<0,001	<0,001	0,994	<0,001
	N	522	522	522	522	495	489	489	493	433	515	519	516	522	442	522	520	517
HBA1c	Pearson Correlation	,150**	-0,091	,186**	,251**	,643**	,101*	,117*	-,151**	-,167**	-,152**	0,024	,105*	,731**	1	,166**	0,037	-,217**
	Sig. (2-tailed)	0,001	0,054	<0,001	<0,001	<0,001	0,037	0,015	0,001	0,001	0,001	0,618	0,027	<0,001		<0,001	0,436	<0,001
	N	448	448	448	448	435	431	432	443	390	445	439	445	442	448	448	446	447
AHI	Pearson Correlation	-0,026	,091*	,373**	,367**	0,037	,114**	0,019	-,155**	0,032	0,007	0,029	,098*	,172**	,166**	1	,226**	-,574**
	Sig. (2-tailed)	0,546	0,03	<0,001	<0,001	0,403	0,01	0,674	<0,001	0,501	0,874	0,498	0,021	<0,001	<0,001		<0,001	<0,001
	N	562	562	562	562	521	512	511	518	457	545	541	546	522	448	562	560	557
Longest Event	Pearson Correlation	0,081	0,036	0,072	0,067	0,017	-0,007	,145**	0,034	0,036	0,061	-0,047	-0,023	0	0,037	,226**	1	-,327**
	Sig. (2-tailed)	0,054	0,398	0,089	0,111	0,697	0,871	0,001	0,436	0,442	0,155	0,28	0,591	0,994	0,436	<0,001		<0,001
	N	560	560	560	560	519	510	509	516	455	543	539	544	520	446	560	560	555
$minO_2$	Pearson Correlation	-0,071	0,034	-,326**	-,387**	-,088*	-0,027	-,093*	0,053	-0,004	-0,014	-0,058	-0,039	-,166**	-,217**	-,574**	-,327**	1
	Sig. (2-tailed)	0,094	0,423	<0,001	<0,001	0,046	0,536	0,037	0,231	0,93	0,75	0,177	0,359	<0,001	<0,001	<0,001	<0,001	
	N	557	557	557	557	517	508	507	514	453	540	536	541	517	447	557	555	557

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

Tab. 34: Correlation 1.Measurement AASM II male

		Age	Height	Weight	BMI	DM	MI	Apoplexy	HDL	LDL	Chol	CRP	TG	FPG	HBA1c	AHI	Longest Event	$minO_2$
Age	Pearson Correlation	1	-,333**	-,199**	-0,075	,174**	,292**	0,086	0,072	-,215**	-,253**	-0,018	-,178**	0,097	,186**	-0,026	,117*	-0,06
	Sig. (2-tailed)		<0,001	<0,001	0,151	0,001	<0,001	0,113	0,179	<0,001	<0,001	0,73	0,001	0,073	0,001	0,614	0,024	0,249
	N	372	372	372	372	346	339	339	347	300	360	357	360	343	301	372	371	369
Height	Pearson Correlation	-,333**	1	,338**	-0,038	-,117*	-,145**	-0,009	-0,064	0,047	0,065	0,041	0,096	-0,096	-,146*	0,025	-0,017	0,046
	Sig. (2-tailed)	<0,001		<0,001	0,46	0,029	0,008	0,87	0,235	0,413	0,218	0,438	0,069	0,077	0,011	0,631	0,746	0,374
	N	372	372	372	372	346	339	339	347	300	360	357	360	343	301	372	371	369
Weight	Pearson Correlation	-,199**	,338**	1	,924**	,222**	0,003	0,028	-,181*	-0,016	0,009	-0,002	,153**	,293**	,252**	,385**	0,068	-,344**
	Sig. (2-tailed)	<0,001	<0,001		<0,001	<0,001	0,962	0,61	0,001	0,784	0,868	0,976	0,004	<0,001	<0,001	<0,001	0,194	<0,001
	N	372	372	372	372	346	339	339	347	300	360	357	360	343	301	372	371	369
BMI	Pearson Correlation	-0,075	-0,038	,924**	1	,276**	0,055	0,037	-,161*	-0,027	-0,013	-0,013	,121*	,348**	,321**	,395**	0,088	-,383**
	Sig. (2-tailed)	0,151	0,46	<0,001		<0,001	0,312	0,492	0,003	0,643	0,804	0,8	0,022	<0,001	<0,001	<0,001	0,092	<0,001
	N	372	372	372	372	346	339	339	347	300	360	357	360	343	301	372	371	369
DM	Pearson Correlation	,174**	-,117*	,222**	,276**	1	0,083	,139*	0,009	-,250**	-,201**	0,013	-0,022	,540**	,650**	0,063	0,035	-0,104
	Sig. (2-tailed)	0,001	0,029	<0,001	<0,001		0,13	0,011	0,87	<0,001	<0,001	0,817	0,688	<0,001	<0,001	0,239	0,522	0,054
	N	346	346	346	346	346	336	338	332	286	340	336	340	328	294	346	345	344
MI	Pearson Correlation	,292**	-,145**	0,003	0,055	0,083	1	0,043	-0,002	-,229**	-,215**	0,013	0,021	,110*	,121*	,127*	0,003	-0,053
	Sig. (2-tailed)	<0,001	0,008	0,962	0,312	0,13		0,428	0,977	<0,001	<0,001	0,809	0,706	0,049	0,039	0,019	0,951	0,334
	N	339	339	339	339	336	339	337	324	278	332	328	331	322	290	339	338	337
Apoplexy	Pearson Correlation	0,086	-0,009	0,028	0,037	,139*	0,043	1	-0,046	-,122*	-0,076	0,035	0,025	,157**	,145*	0,002	,176**	-0,048
	Sig. (2-tailed)	0,113	0,87	0,61	0,492	0,011	0,428		0,405	0,041	0,164	0,532	0,649	0,005	0,013	0,969	0,001	0,383
	N	339	339	339	339	338	337	339	325	279	333	328	332	323	292	339	338	337
HDL	Pearson Correlation	0,072	-0,064	-,181**	-,161**	0,009	-0,002	-0,046	1	0,013	,233**	-0,087	-,383**	-,129*	-0,083	-,111*	0,001	0,009
	Sig. (2-tailed)	0,179	0,235	0,001	0,003	0,87	0,977	0,405		0,826	<0,001	0,11	<0,001	0,019	0,155	0,039	0,986	0,866
	N	347	347	347	347	332	324	325	347	300	347	339	346	327	296	347	346	344
LDL	Pearson Correlation	-,215**	0,047	-0,016	-0,027	-,250**	-,229**	-,122*	0,013	1	,883**	-0,05	0,069	-,131*	-,167**	0,009	-0,015	-0,014
	Sig. (2-tailed)	<0,001	0,413	0,784	0,643	<0,001	<0,001	0,041	0,826		<0,001	0,389	0,234	0,028	0,007	0,877	0,802	0,814
	N	300	300	300	300	286	278	279	300	300	300	294	299	281	255	300	299	297
Chol	Pearson Correlation	-,253**	0,065	0,009	-0,013	-,201**	-,215**	-0,076	,233**	,883**	1	-0,069	,316**	-0,026	-0,108	0,008	-0,011	-0,012
	Sig. (2-tailed)	<0,001	0,218	0,868	0,804	<0,001	<0,001	0,164	<0,001	<0,001		0,198	<0,001	0,636	0,062	0,876	0,837	0,819
	N	360	360	360	360	340	332	333	347	300	360	351	359	337	299	360	359	357
CRP	Pearson Correlation	-0,018	0,041	-0,002	-0,013	0,013	0,013	0,035	-0,087	-0,05	-0,069	1	0,031	0,056	0,028	0,02	-0,058	-0,017
	Sig. (2-tailed)	0,73	0,438	0,976	0,8	0,817	0,809	0,532	0,11	0,389	0,198		0,559	0,301	0,638	0,702	0,279	0,752
	N	357	357	357	357	336	328	328	339	294	351	357	351	340	293	357	356	354
TG	Pearson Correlation	-,178**	0,096	,153**	,121*	-0,022	0,021	0,025	-,383**	0,069	,316**	0,031	1	,150**	0,08	0,087	-0,036	0,007
	Sig. (2-tailed)	0,001	0,069	0,004	0,022	0,688	0,706	0,649	<0,001	0,234	<0,001	0,559		0,006	0,167	0,1	0,497	0,898
	N	360	360	360	360	340	331	332	346	299	359	351	360	337	298	360	359	357
FPG	Pearson Correlation	0,097	-0,096	,293**	,348**	,540**	,110*	,157**	-,129*	-,131*	-0,026	0,056	,150**	1	,749**	,205**	0,052	-,170**
	Sig. (2-tailed)	0,073	0,077	<0,001	<0,001	<0,001	0,049	0,005	0,019	0,028	0,636	0,301	0,006		<0,001	<0,001	0,339	0,002
	N	343	343	343	343	328	322	323	327	281	337	340	337	343	296	343	342	340
HBA1c	Pearson Correlation	,186**	-,146*	,252**	,321**	,650**	,121*	,145*	-0,083	-,167**	-0,108	0,028	0,08	,749**	1	,183**	0,086	-,247**
	Sig. (2-tailed)	0,001	0,011	<0,001	<0,001	<0,001	0,039	0,013	0,155	0,007	0,062	0,638	0,167	<0,001		0,001	0,136	<0,001
	N	301	301	301	301	294	290	292	296	255	299	293	298	296	301	301	300	301
AHI	Pearson Correlation	-0,026	0,025	,385**	,395**	0,063	,127*	0,002	-,111*	0,009	0,008	0,02	0,087	,205**	,183**	1	,246**	-,596**
	Sig. (2-tailed)	0,614	0,631	<0,001	<0,001	0,239	0,019	0,969	0,039	0,877	0,876	0,702	0,1	<0,001	0,001		<0,001	<0,001
	N	372	372	372	372	346	339	339	347	300	360	357	360	343	301	372	371	369
Longest Event	Pearson Correlation	,117*	-0,017	0,068	0,088	0,035	0,003	,176**	0,001	-0,015	-0,011	-0,058	-0,036	0,052	0,086	,246**	1	-,378**
	Sig. (2-tailed)	0,024	0,746	0,194	0,092	0,522	0,951	0,001	0,986	0,802	0,837	0,279	0,497	0,339	0,136	<0,001		<0,001
	N	371	371	371	371	345	338	338	346	299	359	356	359	342	300	371	371	368
$minO_2$	Pearson Correlation	-0,06	0,046	-,344**	-,383**	-0,104	-0,053	-0,048	0,009	-0,014	-0,012	-0,017	0,007	-,170**	-,247**	-,596**	-,378**	1
	Sig. (2-tailed)	0,249	0,374	<0,001	<0,001	0,054	0,334	0,383	0,866	0,814	0,819	0,752	0,898	0,002	<0,001	<0,001	<0,001	
	N	369	369	369	369	344	337	337	344	297	357	354	357	340	301	369	368	369

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

Tab. 35: Correlation 1.Measurement AASM II female

		Age	Height	Weight	BMI	DM	MI	Apoplexy	HDL	LDL	Chol	CRP	TG	FPG	HBA1c	AHI	Longest Event	$minO_2$
Age	Pearson Correlation	1	-,398**	-,318**	-,184*	0,143	0,134	,180*	0,025	-0,153	-0,11	-0,071	-0,04	,154*	0,1	0,056	0,039	-0,109
	Sig. (2-tailed)		<0,001	<0,001	0,011	0,059	0,08	0,018	0,747	0,056	0,135	0,341	0,585	0,039	0,227	0,444	0,591	0,135
	N	190	190	190	190	175	173	172	171	157	185	184	186	179	147	190	189	188
Height	Pearson Correlation	-,398**	1	,261**	-0,083	-,212**	0,005	-,199**	-0,014	-0,028	0,008	-0,029	0,016	-,206**	-,193*	-0,095	0,043	0,121
	Sig. (2-tailed)	<0,001		<0,001	0,257	0,005	0,946	0,009	0,855	0,723	0,91	0,7	0,826	0,006	0,019	0,192	0,554	0,098
	N	190	190	190	190	175	173	172	171	157	185	184	186	179	147	190	189	188
Weight	Pearson Correlation	-,318**	,261**	1	,938**	0,056	-0,053	-0,006	-,250*	-0,074	-0,021	0,1	,317**	,178*	0,023	,262*	0,036	-,337**
	Sig. (2-tailed)	<0,001	<0,001		<0,001	0,458	0,489	0,942	0,001	0,359	0,778	0,178	<0,001	0,017	0,784	<0,001	0,626	<0,001
	N	190	190	190	190	175	173	172	171	157	185	184	186	179	147	190	189	188
BMI	Pearson Correlation	-,184*	-0,083	,938**	1	0,14	-0,058	0,07	-,244*	-0,072	-0,019	0,11	,321**	,260**	0,096	,306**	0,024	-,394**
	Sig. (2-tailed)	0,011	0,257	<0,001		0,065	0,45	0,363	0,001	0,369	0,794	0,138	<0,001	<0,001	0,249	<0,001	0,748	<0,001
	N	190	190	190	190	175	173	172	171	157	185	184	186	179	147	190	189	188
DM	Pearson Correlation	0,143	-,212*	0,056	0,14	1	-0,082	0,056	-0,131	-0,115	-0,144	-0,023	,215*	,628**	,632*	-0,048	-0,026	-0,049
	Sig. (2-tailed)	0,059	0,005	0,458	0,065		0,286	0,462	0,098	0,164	0,06	0,769	0,005	<0,001	<0,001	0,526	0,73	0,524
	N	175	175	175	175	175	173	172	161	147	171	171	172	167	141	175	174	173
MI	Pearson Correlation	0,134	0,005	-0,053	-0,058	-0,082	1	-0,042	-0,147	-0,129	-,155*	-0,023	0,039	-0,015	0,021	0,002	-0,06	0,069
	Sig. (2-tailed)	0,08	0,946	0,489	0,45	0,286		0,584	0,065	0,12	0,043	0,763	0,614	0,845	0,804	0,978	0,438	0,37
	N	173	173	173	173	173	173	172	160	146	170	170	171	167	141	173	172	171
Apoplexy	Pearson Correlation	,180*	-,199*	-0,006	0,07	0,056	-0,042	1	-0,09	-0,109	-,158*	0,015	0,03	0,076	0,048	0,046	0,074	-,193*
	Sig. (2-tailed)	0,018	0,009	0,942	0,363	0,462	0,584		0,262	0,194	0,04	0,847	0,7	0,331	0,572	0,553	0,334	0,012
	N	172	172	172	172	172	172	172	159	145	169	169	170	166	140	172	171	170
HDL	Pearson Correlation	0,025	-0,014	-,250**	-,244**	-0,131	-0,147	-0,09	1	0,122	,517**	0,022	-,455**	-0,102	-,265**	-,180*	0,117	0,126
	Sig. (2-tailed)	0,747	0,855	0,001	0,001	0,098	0,065	0,262		0,127	<0,001	0,781	<0,001	0,192	0,001	0,019	0,13	0,103
	N	171	171	171	171	161	160	159	171	157	170	169	171	166	147	171	170	170
LDL	Pearson Correlation	-0,153	-0,028	-0,074	-0,072	-0,115	-0,129	-0,109	0,122	1	,832**	,184*	-0,105	-,224**	-0,156	0,108	0,141	0,017
	Sig. (2-tailed)	0,056	0,723	0,359	0,369	0,164	0,12	0,194	0,127		<0,001	0,022	0,193	0,006	0,07	0,177	0,078	0,835
	N	157	157	157	157	147	146	145	157	157	156	155	157	152	135	157	156	156
Chol	Pearson Correlation	-0,11	0,008	-0,021	-0,019	-0,144	-,155*	-,158*	,517**	,832**	1	0,095	0,067	-,174*	-,238**	0,044	,217**	-0,021
	Sig. (2-tailed)	0,135	0,91	0,778	0,794	0,06	0,043	0,04	<0,001	<0,001		0,2	0,368	0,02	0,004	0,55	0,003	0,782
	N	185	185	185	185	171	170	169	170	156	185	183	185	178	146	185	184	183
CRP	Pearson Correlation	-0,071	-0,029	0,1	0,11	-0,023	-0,023	0,015	0,022	,184*	0,095	1	0	0,041	0,006	0,049	-0,024	-0,144
	Sig. (2-tailed)	0,341	0,7	0,178	0,138	0,769	0,763	0,847	0,781	0,022	0,2		0,998	0,585	0,94	0,511	0,748	0,052
	N	184	184	184	184	171	170	169	169	155	183	184	184	179	146	184	183	182
TG	Pearson Correlation	-0,04	0,016	,317**	,321**	,215**	0,039	0,03	-,455**	-0,105	0,067	0	1	,207**	0,162	0,065	-0,015	-0,144
	Sig. (2-tailed)	0,585	0,826	<0,001	<0,001	0,005	0,614	0,7	<0,001	0,193	0,368	0,998		0,005	0,05	0,379	0,843	0,051
	N	186	186	186	186	172	171	170	171	157	185	184	186	179	147	186	185	184
FPG	Pearson Correlation	,154*	-,206**	,178*	,260**	,628**	-0,015	0,076	-0,102	-,224**	-,174*	0,041	,207**	1	,692**	0,09	-0,104	-,156*
	Sig. (2-tailed)	0,039	0,006	0,017	<0,001	<0,001	0,845	0,331	0,192	0,006	0,02	0,585	0,005		<0,001	0,229	0,168	0,039
	N	179	179	179	179	167	167	166	166	152	178	179	179	179	146	179	178	177
HBA1c	Pearson Correlation	0,1	-,193*	0,023	0,096	,632**	0,021	0,048	-,265**	-0,156	-,238**	0,006	0,162	,692**	1	0,123	-0,074	-0,153
	Sig. (2-tailed)	0,227	0,019	0,784	0,249	<0,001	0,804	0,572	0,001	0,07	0,004	0,94	0,05	<0,001		0,139	0,375	0,066
	N	147	147	147	147	141	141	140	147	135	146	146	147	146	147	147	146	146
AHI	Pearson Correlation	0,056	-0,095	,262**	,306**	-0,048	0,002	0,046	-,180*	0,108	0,044	0,049	0,065	0,09	0,123	1	,170*	-,537**
	Sig. (2-tailed)	0,444	0,192	<0,001	<0,001	0,526	0,978	0,553	0,019	0,177	0,55	0,511	0,379	0,229	0,139		0,019	<0,001
	N	190	190	190	190	175	173	172	171	157	185	184	186	179	147	190	189	188
Longest Event	Pearson Correlation	0,039	0,043	0,036	0,024	-0,026	-0,06	0,074	0,117	0,141	,217**	-0,024	-0,015	-0,104	-0,074	,170*	1	-,225**
	Sig. (2-tailed)	0,591	0,554	0,626	0,748	0,73	0,438	0,334	0,13	0,078	0,003	0,748	0,843	0,168	0,375	0,019		0,002
	N	189	189	189	189	174	172	171	170	156	184	183	185	178	146	189	189	187
$minO_2$	Pearson Correlation	-0,109	0,121	-,337**	-,394**	-0,049	0,069	-,193*	0,126	0,017	-0,021	-0,144	-0,144	-,156*	-0,153	-,537**	-,225**	1
	Sig. (2-tailed)	0,135	0,098	<0,001	<0,001	0,524	0,37	0,012	0,103	0,835	0,782	0,052	0,051	0,039	0,066	<0,001	0,002	
	N	188	188	188	188	173	171	170	170	156	183	182	184	177	146	188	187	188

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

Tab. 36: Correlation 1.Measurement AASM II BMI>25 in Total

		Age	Height	Weight	BMI	DM	MI	Apoplexy	HDL	LDL	Chol	CRP	TG	FPG	HBA1c	AHI	Longest Event	$minO_2$
Age	Pearson Correlation	1	-,384**	-,277**	-0,086	,163*	,234**	,114*	0,08	-,192**	-,199**	-0,029	-,133**	,131**	,158**	-0,029	,097*	-,099*
	Sig. (2-tailed)		<0,001	<0,001	0,056	<0,001	<0,001	0,015	0,089	<0,001	<0,001	0,535	0,004	0,005	0,002	0,526	0,031	0,029
	N	490	490	490	490	459	455	453	455	407	474	471	475	453	396	490	488	488
Height	Pearson Correlation	-,384**	1	,467**	-0,077	-0,063	0,021	-0,06	-,196**	-0,055	-0,056	-0,029	,140**	-0,079	-0,08	0,049	0,011	0,08
	Sig. (2-tailed)	<0,001		<0,001	0,088	0,178	0,651	0,2	<0,001	0,269	0,223	0,526	0,002	0,095	0,111	0,277	0,802	0,077
	N	490	490	490	490	459	455	453	455	407	474	471	475	453	396	490	488	488
Weight	Pearson Correlation	-,277**	,467**	1	,840**	,182**	0,012	0,011	-,250**	-,110*	-,114*	0,034	,162**	,212**	,183**	,357**	0,078	-,342**
	Sig. (2-tailed)	<0,001	<0,001		<0,001	<0,001	0,799	0,807	<0,001	0,027	0,013	0,465	<0,001	<0,001	<0,001	<0,001	0,083	<0,001
	N	490	490	490	490	459	455	453	455	407	474	471	475	453	396	490	488	488
BMI	Pearson Correlation	-0,086	-0,077	,840**	1	,238**	-0,003	0,049	-,166**	-0,094	-,096*	0,052	,102*	,281**	,254**	,362**	0,084	-,433**
	Sig. (2-tailed)	0,056	0,088	<0,001		<0,001	0,942	0,298	<0,001	0,059	0,036	0,257	0,027	<0,001	<0,001	<0,001	0,064	<0,001
	N	490	490	490	490	459	455	453	455	407	474	471	475	453	396	490	488	488
DM	Pearson Correlation	,163**	-0,063	,182**	,238**	1	0,05	0,083	-0,043	-,241**	-,214**	-0,009	0,027	,560**	,638**	0,034	-0,001	-,096*
	Sig. (2-tailed)	<0,001	0,178	<0,001	<0,001		0,29	0,078	0,369	<0,001	<0,001	0,842	0,569	<0,001	<0,001	0,473	0,987	0,041
	N	459	459	459	459	459	452	452	435	388	450	447	451	436	386	459	457	457
MI	Pearson Correlation	,234**	0,021	0,012	-0,003	0,05	1	0,029	-0,046	-,216**	-,215**	0,003	0,036	0,084	0,099	,113*	-0,004	-0,025
	Sig. (2-tailed)	<0,001	0,651	0,799	0,942	0,29		0,538	0,347	<0,001	<0,001	0,944	0,445	0,08	0,054	0,016	0,932	0,589
	N	455	455	455	455	452	455	452	430	383	445	442	445	433	384	455	453	453
Apoplexy	Pearson Correlation	,114*	-0,06	0,011	0,049	0,083	0,029	1	-0,061	-,146**	-,130**	-0,014	0,019	,098*	,113*	-0,01	,147**	-0,09
	Sig. (2-tailed)	0,015	0,2	0,807	0,298	0,078	0,538		0,207	0,004	0,006	0,774	0,696	0,042	0,027	0,831	0,002	0,056
	N	453	453	453	453	452	452	453	429	382	444	440	444	432	384	453	451	451
HDL	Pearson Correlation	0,08	-,196**	-,250**	-,166**	-0,043	-0,046	-0,061	1	0,087	,312**	-0,003	-,423**	-,101*	-,127*	-,156**	0,003	0,038
	Sig. (2-tailed)	0,089	<0,001	<0,001	<0,001	0,369	0,347	0,207		0,078	<0,001	0,956	<0,001	0,037	0,012	0,001	0,942	0,419
	N	455	455	455	455	435	430	429	455	407	454	446	454	432	391	455	453	453
LDL	Pearson Correlation	-,192**	-0,055	-,110*	-0,094	-,241**	-,216**	-,146**	0,087	1	,869**	0,016	0,003	-,189**	-,170**	0,018	0,016	0,003
	Sig. (2-tailed)	<0,001	0,269	0,027	0,059	<0,001	<0,001	0,004	0,078		<0,001	0,754	0,956	<0,001	0,001	0,716	0,747	0,957
	N	407	407	407	407	388	383	382	407	407	406	399	406	385	350	407	405	405
Chol	Pearson Correlation	-,199**	-0,056	-,114*	-,096*	-,214**	-,215**	-,130**	,312**	,869**	1	0,018	,227**	-,108*	-,146**	-0,008	0,036	-0,016
	Sig. (2-tailed)	<0,001	0,223	0,013	0,036	<0,001	<0,001	0,006	<0,001	<0,001		0,705	<0,001	0,022	0,004	0,854	0,438	0,723
	N	474	474	474	474	450	445	444	454	406	474	464	473	446	393	474	472	472
CRP	Pearson Correlation	-0,029	-0,029	0,034	0,052	-0,009	0,003	-0,014	-0,003	0,016	0,018	1	0,03	0,04	0,028	0,022	-0,055	-0,067
	Sig. (2-tailed)	0,535	0,526	0,465	0,257	0,842	0,944	0,774	0,956	0,754	0,705		0,519	0,394	0,579	0,635	0,236	0,15
	N	471	471	471	471	447	442	440	446	399	464	471	465	451	388	471	469	469
TG	Pearson Correlation	-,133**	,140**	,162**	,102*	0,027	0,036	0,019	-,423**	0,003	,227**	0,03	1	,127**	0,074	0,081	-0,017	-0,024
	Sig. (2-tailed)	0,004	0,002	<0,001	0,027	0,569	0,445	0,696	<0,001	0,956	<0,001	0,519		0,007	0,144	0,079	0,714	0,605
	N	475	475	475	475	451	445	444	454	406	473	465	475	447	393	475	473	473
FPG	Pearson Correlation	,131**	-0,079	,212**	,281**	,560**	0,084	,098*	-,101*	-,189**	-,108*	0,04	,127**	1	,744**	,162**	0,012	-,185**
	Sig. (2-tailed)	0,005	0,095	<0,001	<0,001	<0,001	0,08	0,042	0,037	<0,001	0,022	0,394	0,007		<0,001	0,001	0,805	<0,001
	N	453	453	453	453	436	433	432	432	385	446	451	447	453	390	453	451	451
HBA1c	Pearson Correlation	,158**	-0,08	,183**	,254**	,638**	0,099	,113*	-,127*	-,170**	-,146**	0,028	0,074	,744**	1	,170**	0,062	-,228**
	Sig. (2-tailed)	0,002	0,111	<0,001	<0,001	<0,001	0,054	0,027	0,012	0,001	0,004	0,579	0,144	<0,001		0,001	0,219	<0,001
	N	396	396	396	396	386	384	384	391	350	393	388	393	390	396	396	394	395
AHI	Pearson Correlation	-0,029	0,049	,357**	,362**	0,034	,113*	-0,01	-,156**	0,018	-0,008	0,022	0,081	,162**	,170**	1	,215**	-,596**
	Sig. (2-tailed)	0,526	0,277	<0,001	<0,001	0,473	0,016	0,831	0,001	0,716	0,854	0,635	0,079	0,001	0,001		<0,001	<0,001
	N	490	490	490	490	459	455	453	455	407	474	471	475	453	396	490	488	488
Longest Event	Pearson Correlation	,097*	0,011	0,078	0,084	-0,001	-0,004	,147**	0,003	0,016	0,036	-0,055	-0,017	0,012	0,062	,215**	1	-,342**
	Sig. (2-tailed)	0,031	0,802	0,083	0,064	0,987	0,932	0,002	0,942	0,747	0,438	0,236	0,714	0,805	0,219	<0,001		<0,001
	N	488	488	488	488	457	453	451	453	405	472	469	473	451	394	488	488	486
$minO_2$	Pearson Correlation	-,099*	0,08	-,342**	-,433**	-,096*	-0,025	-0,09	0,038	0,003	-0,016	-0,067	-0,024	-,185**	-,228**	-,596**	-,342**	1
	Sig. (2-tailed)	0,029	0,077	<0,001	<0,001	0,041	0,589	0,056	0,419	0,957	0,723	0,15	0,605	<0,001	<0,001	<0,001	<0,001	
	N	488	488	488	488	457	453	451	453	405	472	469	473	451	395	488	486	488

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

Tab. 37: Correlation 1.Measurement AASM II BMI>25 Male

		Age	Height	Weight	BMI	DM	MI	Apoplexy	HDL	LDL	Chol	CRP	TG	FPG	HBA1c	AHI	Longest Event	$minO_2$
Age	Pearson Correlation	1	-,364**	-,197**	-0,05	,188**	,298**	0,08	0,028	-,237**	-,279**	-0,027	-,150**	,123*	,211**	-0,043	,130*	-0,094
	Sig. (2-tailed)		<0,001	<0,001	0,36	0,001	<0,001	0,164	0,621	<0,001	<0,001	0,627	0,007	0,031	<0,001	0,438	0,018	0,088
	N	333	333	333	333	310	306	305	310	272	321	319	321	305	270	333	332	332
Height	Pearson Correlation	-,364**	1	,324**	-0,096	-,125*	-,120*	-0,035	-0,025	-0,017	0,044	-0,004	0,089	-,135*	-,159**	-0,016	-0,059	0,093
	Sig. (2-tailed)	<0,001		<0,001	0,08	0,027	0,037	0,54	0,66	0,776	0,435	0,939	0,112	0,019	0,009	0,77	0,282	0,09
	N	333	333	333	333	310	306	305	310	272	321	319	321	305	270	333	332	332
Weight	Pearson Correlation	-,197**	,324**	1	,908**	,215**	-0,015	0,04	-,144*	-0,087	-0,06	0,048	0,091	,260**	,229**	,409**	0,064	-,388**
	Sig. (2-tailed)	<0,001	<0,001		<0,001	<0,001	0,8	0,487	0,011	0,152	0,282	0,39	0,104	<0,001	<0,001	<0,001	0,245	<0,001
	N	333	333	333	333	310	306	305	310	272	321	319	321	305	270	333	332	332
BMI	Pearson Correlation	-0,05	-0,096	,908**	1	,276**	0,034	0,06	-,128*	-0,083	-0,08	0,049	0,053	,328**	,308**	,430**	0,099	-,446**
	Sig. (2-tailed)	0,36	0,08	<0,001		<0,001	0,551	0,295	0,024	0,172	0,151	0,383	0,341	<0,001	<0,001	<0,001	0,071	<0,001
	N	333	333	333	333	310	306	305	310	272	321	319	321	305	270	333	332	332
DM	Pearson Correlation	,188**	-,125*	,215**	,276**	1	0,085	0,098	0,01	-,262**	-,226**	0,007	-0,046	,528**	,648**	0,067	0,023	-,116*
	Sig. (2-tailed)	0,001	0,027	<0,001	<0,001		0,139	0,09	0,863	<0,001	<0,001	0,902	0,429	<0,001	<0,001	0,242	0,685	0,041
	N	310	310	310	310	310	303	304	296	259	304	301	304	293	263	310	309	309
MI	Pearson Correlation	,298**	-,120*	-0,015	0,034	0,085	1	0,053	0,022	-,230**	-,217**	0,018	0,02	,117*	0,115	,135*	0,002	-0,062
	Sig. (2-tailed)	<0,001	0,037	0,8	0,551	0,139		0,356	0,712	<0,001	<0,001	0,752	0,732	0,046	0,064	0,018	0,973	0,283
	N	306	306	306	306	303	306	304	291	254	299	296	298	290	261	306	305	305
Apoplexy	Pearson Correlation	0,08	-0,035	0,04	0,06	0,098	0,053	1	-0,048	-,157*	-0,108	-0,024	0,025	,118	,139*	-0,029	,165**	-0,045
	Sig. (2-tailed)	0,164	0,54	0,487	0,295	0,09	0,356		0,417	0,012	0,062	0,684	0,671	0,044	0,025	0,61	0,004	0,438
	N	305	305	305	305	304	304	305	291	254	299	295	298	290	262	305	304	304
HDL	Pearson Correlation	0,028	-0,025	-,144*	-,128*	0,01	0,022	-0,048	1	0,06	,221**	-0,047	-,389**	-0,115	-0,073	-,116*	0,008	0,009
	Sig. (2-tailed)	0,621	0,66	0,011	0,024	0,863	0,712	0,417		0,324	<0,001	0,411	<0,001	0,051	0,236	0,042	0,892	0,875
	N	310	310	310	310	296	291	291	310	272	310	303	309	291	265	310	309	309
LDL	Pearson Correlation	-,237**	-0,017	-0,087	-0,083	-,262**	-,230**	-,157*	0,06	1	,886**	-0,066	0,058	-,167**	-,171**	-0,011	-0,033	0,006
	Sig. (2-tailed)	<0,001	0,776	0,152	0,172	<0,001	<0,001	0,012	0,324		<0,001	0,282	0,343	0,008	0,009	0,861	0,593	0,926
	N	272	272	272	272	259	254	254	272	272	272	266	271	254	232	272	271	271
Chol	Pearson Correlation	-,279**	0,044	-0,06	-0,08	-,226**	-,217**	-0,108	,221**	,886**	1	-0,034	,310**	-0,059	-,123*	-0,002	-0,017	0,007
	Sig. (2-tailed)	<0,001	0,435	0,282	0,151	<0,001	<0,001	0,062	<0,001	<0,001		0,548	<0,001	0,312	0,044	0,972	0,764	0,908
	N	321	321	321	321	304	299	299	310	272	321	313	320	299	268	321	320	320
CRP	Pearson Correlation	-0,027	-0,004	0,048	0,049	0,007	0,018	-0,024	-0,047	-0,066	-0,034	1	0,063	0,054	0,043	0,023	-0,072	-0,031
	Sig. (2-tailed)	0,627	0,939	0,39	0,383	0,902	0,752	0,684	0,411	0,282	0,548		0,267	0,346	0,484	0,677	0,2	0,577
	N	319	319	319	319	301	296	295	303	266	313	319	313	303	263	319	318	318
TG	Pearson Correlation	-,150**	0,089	0,091	0,053	-0,046	0,02	0,025	-,389**	0,058	,310**	0,063	1	,118*	0,048	0,09	-0,042	0,019
	Sig. (2-tailed)	0,007	0,112	0,104	0,341	0,429	0,732	0,671	<0,001	0,343	<0,001	0,267		0,042	0,434	0,109	0,455	0,735
	N	321	321	321	321	304	298	298	309	271	320	313	321	299	267	321	320	320
FPG	Pearson Correlation	,123*	-,135*	,260**	,328**	,528**	,117*	,118*	-0,115	-,167**	-0,059	0,054	,118*	1	,762**	,213**	0,062	-,203**
	Sig. (2-tailed)	0,031	0,019	<0,001	<0,001	<0,001	0,046	0,044	0,051	0,008	0,312	0,346	0,042		<0,001	<0,001	0,278	<0,001
	N	305	305	305	305	293	290	290	291	254	299	303	299	305	265	305	304	304
HBA1c	Pearson Correlation	,211**	-,159**	,229**	,308**	,648**	0,115	,139*	-0,073	-,171**	-,123*	0,043	0,048	,762**	1	,186**	0,095	-,260**
	Sig. (2-tailed)	<0,001	0,009	<0,001	<0,001	<0,001	0,064	0,025	0,236	0,009	0,044	0,484	0,434	<0,001		0,002	0,121	<0,001
	N	270	270	270	270	263	261	262	265	232	268	263	267	265	270	270	269	270
AHI	Pearson Correlation	-0,043	-0,016	,409**	,430**	0,067	,135*	-0,029	-,116*	-0,011	-0,002	0,023	0,09	,213**	,186**	1	,212**	-,615**
	Sig. (2-tailed)	0,438	0,77	<0,001	<0,001	0,242	0,018	0,61	0,042	0,861	0,972	0,677	0,109	<0,001	0,002		<0,001	<0,001
	N	333	333	333	333	310	306	305	310	272	321	319	321	305	270	333	332	332
Longest Event	Pearson Correlation	,130*	-0,059	0,064	0,099	0,023	0,002	,165**	0,008	-0,033	-0,017	-0,072	-0,042	0,062	0,095	,212**	1	-,363**
	Sig. (2-tailed)	0,018	0,282	0,245	0,071	0,685	0,973	0,004	0,892	0,593	0,764	0,2	0,455	0,278	0,121	<0,001		<0,001
	N	332	332	332	332	309	305	304	309	271	320	318	320	304	269	332	332	331
$minO_2$	Pearson Correlation	-0,094	0,093	-,388**	-,446**	-,116*	-0,062	-0,045	0,009	0,006	0,007	-0,031	0,019	-,203**	-,260**	-,615**	-,363**	1
	Sig. (2-tailed)	0,088	0,09	<0,001	<0,001	0,041	0,283	0,438	0,875	0,926	0,908	0,577	0,735	<0,001	<0,001	<0,001	<0,001	
	N	332	332	332	332	309	305	304	309	271	320	318	320	304	270	332	331	332

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

Tab. 38: Correlation 1.Measurement AASM II BMI>25 Female

		Age	Height	Weight	BMI	DM	MI	Apoplexy	HDL	LDL	Chol	CRP	TG	FPG	HBA1c	AHI	Longest Event	$minO_2$
Age	Pearson Correlation	1	-,425**	-,341**	-,176*	0,143	0,146	,195*	0,063	-0,151	-0,089	-0,051	-0,026	,180*	0,071	0,058	0,061	-0,112
	Sig. (2-tailed)		<0,001	<0,001	0,027	0,081	0,076	0,017	0,449	0,079	0,277	0,532	0,752	0,029	0,431	0,47	0,448	0,165
	N	157	157	157	157	149	149	148	145	135	153	152	154	148	126	157	156	156
Height	Pearson Correlation	-,425**	1	,322**	-0,091	-,193*	0,01	-,214**	-0,145	0,009	-0,027	-0,021	0,052	-,200*	-0,139	-0,091	-0,009	0,139
	Sig. (2-tailed)	<0,001		<0,001	0,259	0,018	0,908	0,009	0,082	0,915	0,742	0,801	0,524	0,015	0,122	0,259	0,907	0,084
	N	157	157	157	157	149	149	148	145	135	153	152	154	148	126	157	156	156
Weight	Pearson Correlation	-,341**	,322**	1	,912**	0,059	-0,11	-0,061	-,301*	-0,105	-0,147	0,049	,242**	0,099	0,038	,177*	0,05	-,325**
	Sig. (2-tailed)	<0,001	<0,001		<0,001	0,476	0,184	0,46	<0,001	0,226	0,07	0,545	0,003	0,229	0,669	0,027	0,537	<0,001
	N	157	157	157	157	149	149	148	145	135	153	152	154	148	126	157	156	156
BMI	Pearson Correlation	-,176*	-0,091	,912**	1	0,152	-0,12	0,025	-,260**	-0,121	-0,142	0,057	,235**	,194*	0,115	,227**	0,052	-,406**
	Sig. (2-tailed)	0,027	0,259	<0,001		0,064	0,145	0,758	0,002	0,161	0,08	0,483	0,003	0,018	0,201	0,004	0,523	<0,001
	N	157	157	157	157	149	149	148	145	135	153	152	154	148	126	157	156	156
DM	Pearson Correlation	0,143	-,193*	0,059	0,152	1	-0,092	0,052	-0,108	-0,162	-,168*	-0,04	,195*	,631**	,607**	-0,064	-0,075	-0,051
	Sig. (2-tailed)	0,081	0,018	0,476	0,064		0,265	0,532	0,204	0,066	0,042	0,633	0,018	<0,001	<0,001	0,437	0,367	0,535
	N	149	149	149	149	149	149	148	139	129	146	146	147	143	123	149	148	148
MI	Pearson Correlation	0,146	0,01	-0,11	-0,12	-0,092	1	-0,049	-0,155	-0,136	-,176*	-0,031	0,024	-0,03	0,019	-0,013	-0,062	0,088
	Sig. (2-tailed)	0,076	0,908	0,184	0,145	0,265		0,553	0,069	0,124	0,033	0,713	0,777	0,719	0,831	0,879	0,455	0,285
	N	149	149	149	149	149	149	148	139	129	146	146	147	143	123	149	148	148
Apoplexy	Pearson Correlation	,195*	-,214**	-0,061	0,025	0,052	-0,049	1	-0,09	-0,114	-,182*	0,006	0,009	0,061	0,049	0,03	0,105	-,185*
	Sig. (2-tailed)	0,017	0,009	0,46	0,758	0,532	0,553		0,295	0,201	0,029	0,943	0,915	0,473	0,593	0,721	0,204	0,025
	N	148	148	148	148	148	148	148	138	128	145	145	146	142	122	148	147	147
HDL	Pearson Correlation	0,063	-0,145	-,301**	-,260**	-0,108	-0,155	-0,09	1	0,106	,458**	0,063	-,472**	-0,043	-,216*	-,186*	0,032	0,098
	Sig. (2-tailed)	0,449	0,082	<0,001	0,002	0,204	0,069	0,295		0,219	<0,001	0,455	<0,001	0,612	0,015	0,025	0,704	0,241
	N	145	145	145	145	139	139	138	145	135	144	143	145	141	126	145	144	144
LDL	Pearson Correlation	-0,151	0,009	-0,105	-0,121	-0,162	-0,136	-0,114	0,106	1	,822**	,200*	-0,112	-,227**	-0,162	0,103	0,147	0,001
	Sig. (2-tailed)	0,079	0,915	0,226	0,161	0,066	0,124	0,201	0,219		<0,001	0,021	0,195	0,009	0,079	0,235	0,09	0,99
	N	135	135	135	135	129	129	128	135	135	134	133	135	131	118	135	134	134
Chol	Pearson Correlation	-0,089	-0,027	-0,147	-0,142	-,168*	-,176*	-,182*	,458**	,822**	1	0,119	0,069	-,198*	-,189*	0,012	,190*	-0,062
	Sig. (2-tailed)	0,277	0,742	0,07	0,08	0,042	0,033	0,029	<0,001	<0,001		0,145	0,396	0,016	0,035	0,886	0,019	0,449
	N	153	153	153	153	146	146	145	144	134	153	151	153	147	125	153	152	152
CRP	Pearson Correlation	-0,051	-0,021	0,049	0,057	-0,04	-0,031	0,006	0,063	,200*	0,119	1	-0,036	0,019	-0,033	0,029	-0,011	-0,135
	Sig. (2-tailed)	0,532	0,801	0,545	0,483	0,633	0,713	0,943	0,455	0,021	0,145		0,663	0,822	0,715	0,722	0,894	0,098
	N	152	152	152	152	146	146	145	143	133	151	152	152	148	125	152	151	151
TG	Pearson Correlation	-0,026	0,052	,242**	,235**	,195*	0,024	0,009	-,472**	-0,112	0,069	-0,036	1	0,14	0,129	0,019	0,026	-0,132
	Sig. (2-tailed)	0,752	0,524	0,003	0,003	0,018	0,777	0,915	<0,001	0,195	0,396	0,663		0,09	0,151	0,816	0,747	0,103
	N	154	154	154	154	147	147	146	145	135	153	152	154	148	126	154	153	153
FPG	Pearson Correlation	,180*	-,200*	0,099	,194*	,631**	-0,03	0,061	-0,043	-,227**	-,198*	0,019	0,14	1	,700**	0,055	-0,106	-0,154
	Sig. (2-tailed)	0,029	0,015	0,229	0,018	<0,001	0,719	0,473	0,612	0,009	0,016	0,822	0,09		<0,001	0,51	0,201	0,062
	N	148	148	148	148	143	143	142	141	131	147	148	148	148	125	148	147	147
HBA1c	Pearson Correlation	0,071	-0,139	0,038	0,115	,607**	0,019	0,049	-,216*	-0,162	-,189*	-0,033	0,129	,700**	1	0,126	-0,029	-0,158
	Sig. (2-tailed)	0,431	0,122	0,669	0,201	<0,001	0,831	0,593	0,015	0,079	0,035	0,715	0,151	<0,001		0,159	0,747	0,079
	N	126	126	126	126	123	123	122	126	118	125	125	126	125	126	126	125	125
AHI	Pearson Correlation	0,058	-0,091	,177*	,227**	-0,064	-0,013	0,03	-,186*	0,103	0,012	0,029	0,019	0,055	0,126	1	,208**	-,566**
	Sig. (2-tailed)	0,47	0,259	0,027	0,004	0,437	0,879	0,721	0,025	0,235	0,886	0,722	0,816	0,51	0,159		0,009	<0,001
	N	157	157	157	157	149	149	148	145	135	153	152	154	148	126	157	156	156
Longest Event	Pearson Correlation	0,061	-0,009	0,05	0,052	-0,075	-0,062	0,105	0,032	0,147	,190*	-0,011	0,026	-0,106	-0,029	,208**	1	-,299**
	Sig. (2-tailed)	0,448	0,907	0,537	0,523	0,367	0,455	0,204	0,704	0,09	0,019	0,894	0,747	0,201	0,747	0,009		<0,001
	N	156	156	156	156	148	148	147	144	134	152	151	153	147	125	156	156	155
$minO_2$	Pearson Correlation	-0,112	0,139	-,325**	-,406**	-0,051	0,088	-,185*	0,098	0,001	-0,062	-0,135	-0,132	-0,154	-0,158	-,566**	-,299**	1
	Sig. (2-tailed)	0,165	0,084	<0,001	<0,001	0,535	0,285	0,025	0,241	0,99	0,449	0,098	0,103	0,062	0,079	<0,001	<0,001	
	N	156	156	156	156	148	148	147	144	134	152	151	153	147	125	156	155	156

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

Tab. 39: Correlation 1.Measurement AASM II AHI>30 in Total

		Age	Height	Weight	BMI	DM	MI	Apoplexy	HDL	LDL	Chol	CRP	TG	FPG	HBA1c	AHI	Longest Event	$minO_2$
Age	Pearson Correlation	1	-,422**	-,345**	-,160*	0,068	,263**	,190*	0,152	-,203*	-,186*	0,101	-,221**	0,011	0,081	-,159*	0,137	-0,082
	Sig. (2-tailed)		<0,001	<0,001	0,038	0,391	0,001	0,017	0,057	0,015	0,017	0,2	0,004	0,888	0,335	0,04	0,078	0,29
	N	168	168	168	168	160	159	158	158	142	164	163	164	158	144	168	167	167
Height	Pearson Correlation	-,422**	1	,412**	-0,085	0,051	0,052	-0,073	-,192*	-0,043	-0,031	0,113	0,138	-0,027	-0,052	0,062	0,08	0,029
	Sig. (2-tailed)	<0,001		<0,001	0,275	0,519	0,516	0,36	0,016	0,612	0,689	0,152	0,077	0,732	0,539	0,423	0,304	0,711
	N	168	168	168	168	160	159	158	158	142	164	163	164	158	144	168	167	167
Weight	Pearson Correlation	-,345**	,412**	1	,869**	,299**	0,016	-0,14	-,213*	-0,031	-0,032	0,093	0,123	,252**	,244*	,349**	-0,034	-,250*
	Sig. (2-tailed)	<0,001	<0,001		<0,001	<0,001	0,839	0,08	0,007	0,718	0,681	0,239	0,117	0,001	0,003	<0,001	0,66	0,001
	N	168	168	168	168	160	159	158	158	142	164	163	164	158	144	168	167	167
BMI	Pearson Correlation	-,160*	-0,085	,869**	1	,291**	-0,015	-0,11	-0,128	-0,004	-0,017	0,045	0,056	,280**	,291*	,347**	-0,068	-,299*
	Sig. (2-tailed)	0,038	0,275	<0,001		<0,001	0,854	0,167	0,11	0,966	0,827	0,566	0,477	<0,001	<0,001	<0,001	0,383	<0,001
	N	168	168	168	168	160	159	158	158	142	164	163	164	158	144	168	167	167
DM	Pearson Correlation	0,068	0,051	,299**	,291**	1	-0,028	,171*	-0,028	-,222*	-,167*	0,058	-0,021	,562**	,641*	0,112	0,075	-,203*
	Sig. (2-tailed)	0,391	0,519	<0,001	<0,001		0,729	0,032	0,729	0,009	0,035	0,472	0,789	<0,001	<0,001	0,157	0,348	0,01
	N	160	160	160	160	160	157	158	154	138	159	157	159	154	142	160	159	159
MI	Pearson Correlation	,263**	0,052	0,016	-0,015	-0,028	1	-0,078	-0,034	-,241**	-0,141	0,049	0,082	0,029	-0,004	0,069	-0,009	0,043
	Sig. (2-tailed)	0,001	0,516	0,839	0,854	0,729		0,333	0,674	0,005	0,077	0,54	0,308	0,718	0,961	0,387	0,91	0,59
	N	159	159	159	159	157	159	157	152	136	157	156	157	153	140	159	158	158
Apoplexy	Pearson Correlation	,190*	-0,073	-0,14	-0,11	,171*	-0,078	1	0,059	-0,04	0,024	0,092	0,001	0,09	0,105	-0,019	,201*	-,161*
	Sig. (2-tailed)	0,017	0,36	0,08	0,167	0,032	0,333		0,468	0,646	0,765	0,254	0,995	0,267	0,215	0,815	0,012	0,044
	N	158	158	158	158	158	157	158	152	136	157	155	157	153	141	158	157	157
HDL	Pearson Correlation	0,152	-,192*	-,213**	-0,128	-0,028	-0,034	0,059	1	-0,007	,276**	-0,098	-,435**	-,163*	-0,132	-0,097	0,026	-0,042
	Sig. (2-tailed)	0,057	0,016	0,007	0,11	0,729	0,674	0,468		0,938	<0,001	0,222	<0,001	0,046	0,117	0,225	0,75	0,601
	N	158	158	158	158	154	152	152	158	142	158	156	158	150	141	158	157	157
LDL	Pearson Correlation	-,203*	-0,043	-0,031	-0,004	-,222*	-,241**	-0,04	-0,007	1	,839**	0,051	0,086	-0,01	-0,048	,176*	-0,049	-0,06
	Sig. (2-tailed)	0,015	0,612	0,718	0,966	0,009	0,005	0,646	0,938		<0,001	0,547	0,311	0,911	0,59	0,036	0,561	0,476
	N	142	142	142	142	138	136	136	142	142	142	140	142	134	128	142	141	141
Chol	Pearson Correlation	-,186*	-0,031	-0,032	-0,017	-,167*	-0,141	0,024	,276**	,839**	1	0,02	,299**	-0,018	-0,085	0,115	-0,047	-0,07
	Sig. (2-tailed)	0,017	0,689	0,681	0,827	0,035	0,077	0,765	<0,001	<0,001		0,798	<0,001	0,823	0,311	0,144	0,548	0,372
	N	164	164	164	164	159	157	157	158	142	164	161	164	156	144	164	163	163
CRP	Pearson Correlation	0,101	0,113	0,093	0,045	0,058	0,049	0,092	-0,098	0,051	0,02	1	0,034	,174*	,178*	0,033	-0,012	-0,107
	Sig. (2-tailed)	0,2	0,152	0,239	0,566	0,472	0,54	0,254	0,222	0,547	0,798		0,664	0,029	0,034	0,68	0,881	0,176
	N	163	163	163	163	157	156	155	156	140	161	163	161	157	141	163	162	162
TG	Pearson Correlation	-,221**	0,138	0,123	0,056	-0,021	0,082	0,001	-,435**	0,086	,299**	0,034	1	,168*	0,069	0,127	0,006	-0,047
	Sig. (2-tailed)	0,004	0,077	0,117	0,477	0,789	0,308	0,995	<0,001	0,311	<0,001	0,664		0,036	0,41	0,104	0,942	0,553
	N	164	164	164	164	159	157	157	158	142	164	161	164	156	144	164	163	163
FPG	Pearson Correlation	0,011	-0,027	,252**	,280**	,562**	0,029	0,09	-,163*	-0,01	-0,018	,174*	,168*	1	,728**	,245**	0,016	-,279**
	Sig. (2-tailed)	0,888	0,732	0,001	<0,001	<0,001	0,718	0,267	0,046	0,911	0,823	0,029	0,036		<0,001	0,002	0,839	<0,001
	N	158	158	158	158	154	153	153	150	134	156	157	156	158	142	158	157	157
HBA1c	Pearson Correlation	0,081	-0,052	,244**	,291**	,641**	-0,004	0,105	-0,132	-0,048	-0,085	,178*	0,069	,728**	1	,224**	0,055	-,273**
	Sig. (2-tailed)	0,335	0,539	0,003	<0,001	<0,001	0,961	0,215	0,117	0,59	0,311	0,034	0,41	<0,001		0,007	0,518	0,001
	N	144	144	144	144	142	140	141	141	128	144	141	144	142	144	144	143	144
AHI	Pearson Correlation	-,159*	0,062	,349**	,347**	0,112	0,069	-0,019	-0,097	,176*	0,115	0,033	0,127	,245**	,224**	1	-0,018	-,398**
	Sig. (2-tailed)	0,04	0,423	<0,001	<0,001	0,157	0,387	0,815	0,225	0,036	0,144	0,68	0,104	0,002	0,007		0,82	<0,001
	N	168	168	168	168	160	159	158	158	142	164	163	164	158	144	168	167	167
Longest Event	Pearson Correlation	0,137	0,08	-0,034	-0,068	0,075	-0,009	,201*	0,026	-0,049	-0,047	-0,012	0,006	0,016	0,055	-0,018	1	-,371**
	Sig. (2-tailed)	0,078	0,304	0,66	0,383	0,348	0,91	0,012	0,75	0,561	0,548	0,881	0,942	0,839	0,518	0,82		<0,001
	N	167	167	167	167	159	158	157	157	141	163	162	163	157	143	167	167	166
$minO_2$	Pearson Correlation	-0,082	0,029	-,250**	-,299**	-,203*	0,043	-,161*	-0,042	-0,06	-0,07	-0,107	-0,047	-,279**	-,273**	-,398**	-,371**	1
	Sig. (2-tailed)	0,29	0,711	0,001	<0,001	0,01	0,59	0,044	0,601	0,476	0,372	0,176	0,553	<0,001	0,001	<0,001	<0,001	
	N	167	167	167	167	159	158	157	157	141	163	162	163	157	144	167	166	167

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

Tab. 40: Correlation 1.Measurement AASM II AHI>30 Male

		Age	Height	Weight	BMI	DM	MI	Apoplexy	HDL	LDL	Chol	CRP	TG	FPG	HBA1c	AHI	Longest Event	$minO_2$
Age	Pearson Correlation	1	-,376**	-,282**	-0,148	0,107	,340**	0,143	,236*	-,215*	-,197*	0,084	-,274**	0,037	0,099	-0,155	0,146	-0,073
	Sig. (2-tailed)		<0,001	0,001	0,095	0,241	<0,001	0,12	0,01	0,028	0,028	0,356	0,002	0,689	0,311	0,08	0,101	0,415
	N	128	128	128	128	122	121	120	119	105	124	123	124	118	107	128	127	127
Height	Pearson Correlation	-,376**	1	,279**	-0,112	-0,025	-0,071	0,01	-,209*	0,001	-0,006	0,142	0,092	-0,106	-0,051	,174*	0,028	-0,033
	Sig. (2-tailed)	<0,001		0,001	0,208	0,784	0,438	0,915	0,022	0,989	0,943	0,118	0,309	0,253	0,6	0,05	0,753	0,71
	N	128	128	128	128	122	121	120	119	105	124	123	124	118	107	128	127	127
Weight	Pearson Correlation	-,282**	,279**	1	,920**	,342**	-0,03	-0,113	-,209*	-0,017	-0,036	0,076	0,086	,290**	,325**	,397**	-0,097	-,271*
	Sig. (2-tailed)	0,001	0,001		<0,001	<0,001	0,745	0,218	0,023	0,859	0,695	0,402	0,345	0,001	0,001	<0,001	0,278	0,002
	N	128	128	128	128	122	121	120	119	105	124	123	124	118	107	128	127	127
BMI	Pearson Correlation	-0,148	-0,112	,920**	1	,366**	-0,009	-0,112	-0,125	-0,012	-0,036	0,025	0,045	,338**	,364**	,336**	-0,101	-,272*
	Sig. (2-tailed)	0,095	0,208	<0,001		<0,001	0,919	0,224	0,175	0,902	0,693	0,785	0,621	<0,001	<0,001	<0,001	0,257	0,002
	N	128	128	128	128	122	121	120	119	105	124	123	124	118	107	128	127	127
DM	Pearson Correlation	0,107	-0,025	,342**	,366**	1	-0,03	,187*	-0,008	-,214*	-0,158	0,078	-0,076	,513**	,624**	0,13	0,056	-0,175
	Sig. (2-tailed)	0,241	0,784	<0,001	<0,001		0,75	0,041	0,936	0,03	0,083	0,399	0,407	<0,001	<0,001	0,154	0,545	0,056
	N	122	122	122	122	122	119	120	117	103	121	119	121	116	107	122	121	121
MI	Pearson Correlation	,340**	-0,071	-0,03	-0,009	-0,03	1	-0,074	0	-,226*	-0,135	0,074	0,053	0,004	-0,019	0,121	-0,005	0,003
	Sig. (2-tailed)	<0,001	0,438	0,745	0,919	0,75		0,427	0,999	0,023	0,142	0,424	0,566	0,969	0,848	0,185	0,957	0,974
	N	121	121	121	121	119	121	119	115	101	119	118	119	115	105	121	120	120
Apoplexy	Pearson Correlation	0,143	0,01	-0,113	-0,112	,187*	-0,074	1	0,014	-0,037	-0,007	0,14	-0,018	0,084	0,054	0,019	,234*	-0,079
	Sig. (2-tailed)	0,12	0,915	0,218	0,224	0,041	0,427		0,886	0,714	0,942	0,133	0,845	0,374	0,583	0,835	0,01	0,392
	N	120	120	120	120	120	119	120	115	101	119	117	119	115	106	120	119	119
HDL	Pearson Correlation	,236**	-,209*	-,209*	-0,125	-0,008	0	0,014	1	-0,043	,217*	-0,101	-,436**	-,192*	-0,144	-0,144	0,031	-0,022
	Sig. (2-tailed)	0,01	0,022	0,023	0,175	0,936	0,999	0,886		0,661	0,018	0,28	<0,001	0,044	0,146	0,119	0,741	0,816
	N	119	119	119	119	117	115	115	119	105	119	117	119	111	104	119	118	118
LDL	Pearson Correlation	-,215*	0,001	-0,017	-0,012	-,214*	-,226*	-0,037	-0,043	1	,871**	0,032	0,149	0,053	-0,023	0,129	-0,063	-0,081
	Sig. (2-tailed)	0,028	0,989	0,859	0,902	0,03	0,023	0,714	0,661		<0,001	0,749	0,13	0,604	0,826	0,19	0,523	0,414
	N	105	105	105	105	103	101	101	105	105	105	103	105	97	92	105	104	104
Chol	Pearson Correlation	-,197*	-0,006	-0,036	-0,036	-0,158	-0,135	-0,007	,217*	,871**	1	0,007	,350**	0,026	-0,068	0,085	-0,074	-0,057
	Sig. (2-tailed)	0,028	0,943	0,695	0,693	0,083	0,142	0,942	0,018	<0,001		0,937	<0,001	0,781	0,484	0,347	0,418	0,534
	N	124	124	124	124	124	121	119	119	105	124	121	124	116	107	124	123	123
CRP	Pearson Correlation	0,084	0,142	0,076	0,025	0,078	0,074	0,14	-0,101	0,032	0,007	1	0,02	,237*	,260**	0,034	-0,047	-0,097
	Sig. (2-tailed)	0,356	0,118	0,402	0,785	0,399	0,424	0,133	0,28	0,749	0,937		0,831	0,01	0,008	0,709	0,609	0,287
	N	123	123	123	123	119	118	117	117	103	121	123	121	117	104	123	122	122
TG	Pearson Correlation	-,274**	0,092	0,086	0,045	-0,076	0,053	-0,018	-,436**	0,149	,350**	0,02	1	0,161	0,073	0,171	-0,005	-0,029
	Sig. (2-tailed)	0,002	0,309	0,345	0,621	0,407	0,566	0,845	<0,001	0,13	<0,001	0,831		0,084	0,455	0,057	0,959	0,752
	N	124	124	124	124	121	119	119	119	105	124	121	124	116	107	124	123	123
FPG	Pearson Correlation	0,037	-0,106	,290**	,338**	,513**	0,004	0,084	-,192*	0,053	0,026	,237*	0,161	1	,732**	,255**	-0,001	-,240**
	Sig. (2-tailed)	0,689	0,253	0,001	<0,001	<0,001	0,969	0,374	0,044	0,604	0,781	0,01	0,084		<0,001	0,005	0,991	0,009
	N	118	118	118	118	116	115	115	111	97	116	117	116	118	105	118	117	117
HBA1c	Pearson Correlation	0,099	-0,051	,325**	,364**	,624**	-0,019	0,054	-0,144	-0,023	-0,068	,260**	0,073	,732**	1	,247*	0,058	-,269**
	Sig. (2-tailed)	0,311	0,6	0,001	<0,001	<0,001	0,848	0,583	0,146	0,826	0,484	0,008	0,455	<0,001		0,01	0,558	0,005
	N	107	107	107	107	107	105	106	104	92	107	104	107	105	107	107	106	107
AHI	Pearson Correlation	-0,155	,174*	,397**	,336**	0,13	0,121	0,019	-0,144	0,129	0,085	0,034	0,171	,255**	,247*	1	-0,027	-,362**
	Sig. (2-tailed)	0,08	0,05	<0,001	<0,001	0,154	0,185	0,835	0,119	0,19	0,347	0,709	0,057	0,005	0,01		0,762	<0,001
	N	128	128	128	128	122	121	120	119	105	124	123	124	118	107	128	127	127
Longest Event	Pearson Correlation	0,146	0,028	-0,097	-0,101	0,056	-0,005	,234*	0,031	-0,063	-0,074	-0,047	-0,005	-0,001	0,058	-0,027	1	-,428**
	Sig. (2-tailed)	0,101	0,753	0,278	0,257	0,545	0,957	0,01	0,741	0,523	0,418	0,609	0,959	0,991	0,558	0,762		<0,001
	N	127	127	127	127	121	120	119	118	104	123	122	123	117	106	127	127	126
$minO_2$	Pearson Correlation	-0,073	-0,033	-,271**	-,272**	-0,175	0,003	-0,079	-0,022	-0,081	-0,057	-0,097	-0,029	-,240**	-,269**	-,362**	-,428**	1
	Sig. (2-tailed)	0,415	0,71	0,002	0,002	0,056	0,974	0,392	0,816	0,414	0,534	0,287	0,752	0,009	0,005	<0,001	<0,001	
	N	127	127	127	127	121	120	119	118	104	123	122	123	117	107	127	126	127

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

Tab. 41: Correlation 1.Measurement AASM II AHI>30 Female

		Age	Height	Weight	BMI	DM	MI	Apoplexy	HDL	LDL	Chol	CRP	TG	FPG	HBA1c	AHI	Longest Event	$minO_2$
Age	Pearson Correlation	1	-0,219	-,330*	-0,247	0,053	0,134	0,279	-0,19	-0,296	-0,229	0,222	0,107	0,003	0,012	-0,244	0,206	-0,09
	Sig. (2-tailed)		0,174	0,037	0,124	0,75	0,422	0,09	0,246	0,075	0,155	0,168	0,51	0,985	0,944	0,129	0,202	0,579
	N	40	40	40	40	38	38	38	39	37	40	40	40	40	37	40	40	40
Height	Pearson Correlation	-0,219	1	0,278	-0,133	-0,014	0,175	-0,181	-0,178	0,148	0,016	0,129	0,16	-0,057	-0,209	-0,066	0,144	0,198
	Sig. (2-tailed)	0,174		0,083	0,414	0,931	0,294	0,277	0,279	0,382	0,92	0,428	0,324	0,725	0,214	0,686	0,377	0,222
	N	40	40	40	40	38	38	38	39	37	40	40	40	40	37	40	40	40
Weight	Pearson Correlation	-,330*	0,278	1	,914**	-0,085	0,011	-0,189	-0,192	0,095	0,058	0,214	0,185	0,001	-0,282	,377*	0,141	-,330*
	Sig. (2-tailed)	0,037	0,083		<0,001	0,611	0,949	0,257	0,241	0,576	0,721	0,186	0,254	0,997	0,091	0,016	0,385	0,037
	N	40	40	40	40	38	38	38	39	37	40	40	40	40	37	40	40	40
BMI	Pearson Correlation	-0,247	-0,133	,914**	1	-0,092	-0,055	-0,12	-0,139	0,038	0,056	0,164	0,122	0,018	-0,216	,409*	0,074	-,419*
	Sig. (2-tailed)	0,124	0,414	<0,001		0,584	0,741	0,472	0,4	0,822	0,732	0,312	0,454	0,912	0,198	0,009	0,648	0,007
	N	40	40	40	40	38	38	38	39	37	40	40	40	40	37	40	40	40
DM	Pearson Correlation	0,053	-0,014	-0,085	-0,092	1	-0,092	0,175	-0,074	-0,205	-0,187	-0,048	0,203	,766**	,852*	0,085	0,127	-,332*
	Sig. (2-tailed)	0,75	0,931	0,611	0,584		0,584	0,294	0,662	0,236	0,261	0,775	0,222	<0,001	<0,001	0,612	0,446	0,042
	N	38	38	38	38	38	38	38	37	35	38	38	38	38	35	38	38	38
MI	Pearson Correlation	0,134	0,175	0,011	-0,055	-0,092	1	-0,069	-0,155	-0,276	-0,163	-0,116	0,186	0,126	0,104	-0,126	-0,068	0,223
	Sig. (2-tailed)	0,422	0,294	0,949	0,741	0,584		0,681	0,359	0,108	0,329	0,488	0,262	0,451	0,553	0,453	0,684	0,178
	N	38	38	38	38	38	38	38	37	35	38	38	38	38	35	38	38	38
Apoplexy	Pearson Correlation	0,279	-0,181	-0,189	-0,12	0,175	-0,069	1	0,155	-0,067	0,084	-0,045	0,093	0,133	0,333	-0,113	0,144	-,328*
	Sig. (2-tailed)	0,09	0,277	0,257	0,472	0,294	0,681		0,361	0,701	0,615	0,789	0,578	0,427	0,05	0,499	0,39	0,044
	N	38	38	38	38	38	38	38	37	35	38	38	38	38	35	38	38	38
HDL	Pearson Correlation	-0,19	-0,178	-0,192	-0,139	-0,074	-0,155	0,155	1	0,084	,449**	-0,088	-,425**	-0,057	-0,092	0,025	0,03	-0,101
	Sig. (2-tailed)	0,246	0,279	0,241	0,4	0,662	0,359	0,361		0,621	0,004	0,594	0,007	0,728	0,59	0,88	0,857	0,541
	N	39	39	39	39	37	37	37	39	37	39	39	39	39	37	39	39	39
LDL	Pearson Correlation	-0,296	0,148	0,095	0,038	-0,205	-0,276	-0,067	0,084	1	,744**	0,123	-0,083	-0,17	-0,173	0,274	0,014	0,004
	Sig. (2-tailed)	0,075	0,382	0,576	0,822	0,236	0,108	0,701	0,621		<0,001	0,467	0,623	0,313	0,312	0,101	0,935	0,983
	N	37	37	37	37	35	35	35	37	37	37	37	37	37	36	37	37	37
Chol	Pearson Correlation	-0,229	0,016	0,058	0,056	-0,187	-0,163	0,084	,449**	,744**	1	0,079	0,136	-0,152	-0,185	0,188	0,046	-0,104
	Sig. (2-tailed)	0,155	0,92	0,721	0,732	0,261	0,329	0,615	0,004	<0,001		0,627	0,403	0,348	0,274	0,244	0,777	0,523
	N	40	40	40	40	38	38	38	39	37	40	40	40	40	37	40	40	40
CRP	Pearson Correlation	0,222	0,129	0,214	0,164	-0,048	-0,116	-0,045	-0,088	0,123	0,079	1	0,114	-0,124	-,342*	0,033	0,138	-0,154
	Sig. (2-tailed)	0,168	0,428	0,186	0,312	0,775	0,488	0,789	0,594	0,467	0,627		0,483	0,446	0,038	0,84	0,395	0,343
	N	40	40	40	40	38	38	38	39	37	40	40	40	40	37	40	40	40
TG	Pearson Correlation	0,107	0,16	0,185	0,122	0,203	0,186	0,093	-,425**	-0,083	0,136	0,114	1	0,181	0,045	-0,009	0,017	-0,136
	Sig. (2-tailed)	0,51	0,324	0,254	0,454	0,222	0,262	0,578	0,007	0,623	0,403	0,483		0,263	0,79	0,958	0,916	0,404
	N	40	40	40	40	38	38	38	39	37	40	40	40	40	37	40	40	40
FPG	Pearson Correlation	0,003	-0,057	0,001	0,018	,766**	0,126	0,133	-0,057	-0,17	-0,152	-0,124	0,181	1	,767*	0,24	0,062	-,422*
	Sig. (2-tailed)	0,985	0,725	0,997	0,912	<0,001	0,451	0,427	0,728	0,313	0,348	0,446	0,263		<0,001	0,135	0,704	0,007
	N	40	40	40	40	38	38	38	39	37	40	40	40	40	37	40	40	40
HBA1c	Pearson Correlation	0,012	-0,209	-0,282	-0,216	,852*	0,104	0,333	-0,092	-0,173	-0,185	-,342*	0,045	,767**	1	0,166	0,046	-,337*
	Sig. (2-tailed)	0,944	0,214	0,091	0,198	<0,001	0,553	0,05	0,59	0,312	0,274	0,038	0,79	<0,001		0,325	0,788	0,041
	N	37	37	37	37	35	35	35	37	36	37	37	37	37	37	37	37	37
AHI	Pearson Correlation	-0,244	-0,066	,377*	,409**	0,085	-0,126	-0,113	0,025	0,274	0,188	0,033	-0,009	0,24	0,166	1	0,022	-,494**
	Sig. (2-tailed)	0,129	0,686	0,016	0,009	0,612	0,453	0,499	0,88	0,101	0,244	0,84	0,958	0,135	0,325		0,891	0,001
	N	40	40	40	40	38	38	38	39	37	40	40	40	40	37	40	40	40
Longest Event	Pearson Correlation	0,206	0,144	0,141	0,074	0,127	-0,068	0,144	0,03	0,014	0,046	0,138	0,017	0,062	0,046	0,022	1	-0,206
	Sig. (2-tailed)	0,202	0,377	0,385	0,648	0,446	0,684	0,39	0,857	0,935	0,777	0,395	0,916	0,704	0,788	0,891		0,202
	N	40	40	40	40	38	38	38	39	37	40	40	40	40	37	40	40	40
$minO_2$	Pearson Correlation	-0,09	0,198	-,330*	-,419**	-,332*	0,223	-,328*	-0,101	0,004	-0,104	-0,154	-0,136	-,422**	-,337*	-,494**	-0,206	1
	Sig. (2-tailed)	0,579	0,222	0,037	0,007	0,042	0,178	0,044	0,541	0,983	0,523	0,343	0,404	0,007	0,041	0,001	0,202	
	N	40	40	40	40	38	38	38	39	37	40	40	40	40	37	40	40	40

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

Tab. 42: Correlation 1.Measurement AASM II Age>70 in Total

		Age	Height	Weight	BMI	DM	MI	Apoplexy	HDL	LDL	Chol	CRP	TG	FPG	HBA1c	AHI	Longest Event	$minO_2$
Age	Pearson Correlation	1	-0,158	-0,136	-0,063	-0,017	0,08	0,038	-0,069	-0,093	-0,113	0,057	0,035	-0,08	-0,108	0,008	-,257**	-0,011
	Sig. (2-tailed)		0,088	0,142	0,497	0,86	0,417	0,697	0,477	0,386	0,229	0,542	0,712	0,403	0,31	0,931	0,005	0,905
	N	118	118	118	118	108	106	105	109	88	115	115	116	112	91	118	118	116
Height	Pearson Correlation	-0,158	1	,510**	0,044	-0,079	0,144	0	-0,051	-0,005	0,024	0,118	0,128	-0,119	-0,107	0,149	,333**	-0,02
	Sig. (2-tailed)	0,088		<0,001	0,638	0,417	0,14	0,997	0,596	0,962	0,797	0,21	0,171	0,211	0,315	0,107	<0,001	0,83
	N	118	118	118	118	108	106	105	109	88	115	115	116	112	91	118	118	116
Weight	Pearson Correlation	-0,136	,510**	1	,877**	-0,046	0,103	0,026	-0,033	0,103	,187*	0,13	,211*	0,047	-0,004	,298**	,351**	-,339**
	Sig. (2-tailed)	0,142	<0,001		<0,001	0,634	0,294	0,792	0,735	0,337	0,045	0,165	0,023	0,626	0,971	0,001	<0,001	<0,001
	N	118	118	118	118	108	106	105	109	88	115	115	116	112	91	118	118	116
BMI	Pearson Correlation	-0,063	0,044	,877**	1	-0,002	0,033	0,047	0,004	0,105	,210*	0,098	,189*	0,141	0,049	,278**	,214*	-,388**
	Sig. (2-tailed)	0,497	0,638	<0,001		0,984	0,735	0,632	0,964	0,331	0,025	0,299	0,042	0,137	0,641	0,002	0,02	<0,001
	N	118	118	118	118	108	106	105	109	88	115	115	116	112	91	118	118	116
DM	Pearson Correlation	-0,017	-0,079	-0,046	-0,002	1	-0,119	0,101	-0,071	-0,126	-0,142	-0,036	,223*	,558**	,575**	-0,149	0,084	0,03
	Sig. (2-tailed)	0,86	0,417	0,634	0,984		0,23	0,306	0,479	0,261	0,147	0,713	0,021	<0,001	<0,001	0,123	0,385	0,758
	N	108	108	108	108	108	104	105	102	81	106	105	107	103	85	108	108	106
MI	Pearson Correlation	0,08	0,144	0,103	0,033	-0,119	1	-0,056	-0,074	-0,198	-0,194	0,058	-0,108	-0,015	0,026	0,092	0,016	0,054
	Sig. (2-tailed)	0,417	0,14	0,294	0,735	0,23		0,572	0,467	0,082	0,05	0,562	0,275	0,881	0,812	0,349	0,874	0,585
	N	106	106	106	106	104	106	104	99	78	103	103	104	101	83	106	106	104
Apoplexy	Pearson Correlation	0,038	0	0,026	0,047	0,101	-0,056	1	-0,055	-0,072	-0,03	0,15	0,135	0,102	0,142	0,145	0,064	-,247*
	Sig. (2-tailed)	0,697	0,997	0,792	0,632	0,306	0,572		0,588	0,529	0,764	0,132	0,172	0,312	0,197	0,139	0,519	0,012
	N	105	105	105	105	105	104	105	99	78	103	102	104	101	84	105	105	103
HDL	Pearson Correlation	-0,069	-0,051	-0,033	0,004	-0,071	-0,074	-0,055	1	-0,053	,427**	-0,072	-,321**	-0,056	-,220*	-0,153	0,051	-0,018
	Sig. (2-tailed)	0,477	0,596	0,735	0,964	0,479	0,467	0,588		0,625	<0,001	0,461	0,001	0,572	0,037	0,111	0,6	0,853
	N	109	109	109	109	102	99	99	109	88	108	106	109	103	90	109	109	108
LDL	Pearson Correlation	-0,093	-0,005	0,103	0,105	-0,126	-0,198	-0,072	-0,053	1	,881**	0,095	0,095	-0,154	-0,219	,224*	,275**	-,226*
	Sig. (2-tailed)	0,386	0,962	0,337	0,331	0,261	0,082	0,529	0,625		<0,001	0,384	0,378	0,164	0,064	0,036	0,009	0,036
	N	88	88	88	88	81	78	78	88	88	87	87	88	83	72	88	88	87
Chol	Pearson Correlation	-0,113	0,024	,187*	,210*	-0,142	-0,194	-0,03	,427**	,881**	1	0,073	,254**	-0,038	-,261*	0,133	,203*	-,196*
	Sig. (2-tailed)	0,229	0,797	0,045	0,025	0,147	0,05	0,764	<0,001	<0,001		0,447	0,006	0,696	0,014	0,158	0,03	0,038
	N	115	115	115	115	106	103	103	108	87	115	112	115	109	89	115	115	113
CRP	Pearson Correlation	0,057	0,118	0,13	0,098	-0,036	0,058	0,15	-0,072	0,095	0,073	1	0,045	0,012	-0,068	,333**	0,077	-,213*
	Sig. (2-tailed)	0,542	0,21	0,165	0,299	0,713	0,562	0,132	0,461	0,384	0,447		0,639	0,899	0,527	<0,001	0,414	0,024
	N	115	115	115	115	105	103	102	106	87	112	115	113	111	88	115	115	113
TG	Pearson Correlation	0,035	0,128	,211*	,189*	,223*	-0,108	0,135	-,321**	0,095	,254**	0,045	1	,277**	0,164	0,065	0,065	-0,066
	Sig. (2-tailed)	0,712	0,171	0,023	0,042	0,021	0,275	0,172	0,001	0,378	0,006	0,639		0,003	0,122	0,49	0,491	0,488
	N	116	116	116	116	107	104	104	109	88	115	113	116	110	90	116	116	114
FPG	Pearson Correlation	-0,08	-0,119	0,047	0,141	,558**	-0,015	0,102	-0,056	-0,154	-0,038	0,012	,277**	1	,609**	0,04	-0,01	0,003
	Sig. (2-tailed)	0,403	0,211	0,626	0,137	<0,001	0,881	0,312	0,572	0,164	0,696	0,899	0,003		<0,001	0,675	0,92	0,973
	N	112	112	112	112	103	101	101	103	83	109	111	110	112	89	112	112	110
HBA1c	Pearson Correlation	-0,108	-0,107	-0,004	0,049	,575**	0,026	0,142	-,220*	-0,219	-,261*	-0,068	0,164	,609**	1	0,044	0,023	-0,086
	Sig. (2-tailed)	0,31	0,315	0,971	0,641	<0,001	0,812	0,197	0,037	0,064	0,014	0,527	0,122	<0,001		0,678	0,828	0,42
	N	91	91	91	91	85	83	84	90	72	89	88	90	89	91	91	91	91
AHI	Pearson Correlation	0,008	0,149	,298**	,278**	-0,149	0,092	0,145	-0,153	,224*	0,133	,333**	0,065	0,04	0,044	1	,285**	-,545**
	Sig. (2-tailed)	0,931	0,107	0,001	0,002	0,123	0,349	0,139	0,111	0,036	0,158	<0,001	0,49	0,675	0,678		0,002	<0,001
	N	118	118	118	118	108	106	105	109	88	115	115	116	112	91	118	118	116
Longest Event	Pearson Correlation	-,257**	,333**	,351**	,214*	0,084	0,016	0,064	0,051	,275**	,203*	0,077	0,065	-0,01	0,023	,285**	1	-,225*
	Sig. (2-tailed)	0,005	<0,001	<0,001	0,02	0,385	0,874	0,519	0,6	0,009	0,03	0,414	0,491	0,92	0,828	0,002		0,015
	N	118	118	118	118	108	106	105	109	88	115	115	116	112	91	118	118	116
$minO_2$	Pearson Correlation	-0,011	-0,02	-,339**	-,388**	0,03	0,054	-,247*	-0,018	-,226*	-,196*	-,213*	-0,066	0,003	-0,086	-,545**	-,225*	1
	Sig. (2-tailed)	0,905	0,83	<0,001	<0,001	0,758	0,585	0,012	0,853	0,036	0,038	0,024	0,488	0,973	0,42	<0,001	0,015	
	N	116	116	116	116	106	104	103	108	87	113	113	114	110	91	116	116	116

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

Tab. 43: Correlation 1.Measurement AASM II Age>70 Male

		Age	Height	Weight	BMI	DM	MI	Apoplexy	HDL	LDL	Chol	CRP	TG	FPG	HBA1c	AHI	Longest Event	$minO_2$
Age	Pearson Correlation	1	-,288*	-0,142	-0,031	0,089	0,189	-0,079	-0,152	-0,036	-0,073	-0,028	0,059	0,094	-0,025	-0,104	-,353**	-0,134
	Sig. (2-tailed)		0,023	0,27	0,813	0,507	0,159	0,565	0,262	0,819	0,579	0,831	0,653	0,482	0,869	0,422	0,005	0,302
	N	62	62	62	62	58	57	56	56	42	60	59	60	58	46	62	62	61
Height	Pearson Correlation	-,288*	1	,363**	0,003	-0,112	-0,173	0,211	-0,047	0,185	0,235	0,073	0,185	0,052	-0,139	0,094	,434**	-0,118
	Sig. (2-tailed)	0,023		0,004	0,984	0,402	0,199	0,119	0,731	0,241	0,07	0,582	0,157	0,699	0,356	0,466	<0,001	0,364
	N	62	62	62	62	58	57	56	56	42	60	59	60	58	46	62	62	61
Weight	Pearson Correlation	-0,142	,363**	1	,930**	-0,092	-0,034	0,008	-0,017	,312*	,315*	-0,023	0,072	0,01	-0,002	0,156	,424**	-,364**
	Sig. (2-tailed)	0,27	0,004		<0,001	0,491	0,802	0,954	0,904	0,044	0,014	0,864	0,587	0,942	0,989	0,227	0,001	0,004
	N	62	62	62	62	58	57	56	56	42	60	59	60	58	46	62	62	61
BMI	Pearson Correlation	-0,031	0,003	,930**	1	-0,042	0,02	-0,058	0,009	0,264	,256*	-0,042	0,01	0,008	0,042	0,141	,286*	-,353**
	Sig. (2-tailed)	0,813	0,984	<0,001		0,753	0,885	0,671	0,946	0,091	0,048	0,755	0,939	0,951	0,781	0,274	0,024	0,005
	N	62	62	62	62	58	57	56	56	42	60	59	60	58	46	62	62	61
DM	Pearson Correlation	0,089	-0,112	-0,092	-0,042	1	-0,129	0,2	-0,046	-0,199	-0,14	-0,022	0,238	,495**	,556**	-0,217	0,044	0,041
	Sig. (2-tailed)	0,507	0,402	0,491	0,753		0,349	0,139	0,739	0,218	0,3	0,875	0,074	<0,001	<0,001	0,101	0,743	0,761
	N	58	58	58	58	58	55	56	54	40	57	55	57	55	45	58	58	57
MI	Pearson Correlation	0,189	-0,173	-0,034	0,02	-0,129	1	-0,04	0,021	-0,206	-0,183	0,046	-0,15	0,113	0,092	0,04	-0,025	0,066
	Sig. (2-tailed)	0,159	0,199	0,802	0,885	0,349		0,774	0,883	0,214	0,182	0,741	0,275	0,421	0,556	0,765	0,852	0,628
	N	57	57	57	57	55	57	55	52	38	55	54	55	53	43	57	57	56
Apoplexy	Pearson Correlation	-0,079	0,211	0,008	-0,058	0,2	-0,04	1	-0,082	-0,024	0,003	0,269	0,129	0,197	0,294	0,092	0,113	-0,089
	Sig. (2-tailed)	0,565	0,119	0,954	0,671	0,139	0,774		0,565	0,884	0,981	0,051	0,349	0,158	0,053	0,498	0,405	0,519
	N	56	56	56	56	56	55	56	52	38	55	53	55	53	44	56	56	55
HDL	Pearson Correlation	-0,152	-0,047	-0,017	0,009	-0,046	0,021	-0,082	1	-0,226	0,193	-0,021	-,314*	-0,122	-0,007	-0,064	0,056	-0,172
	Sig. (2-tailed)	0,262	0,731	0,904	0,946	0,739	0,883	0,565		0,15	0,154	0,884	0,019	0,39	0,964	0,637	0,682	0,209
	N	56	56	56	56	54	52	52	56	42	56	53	56	52	45	56	56	55
LDL	Pearson Correlation	-0,036	0,185	,312*	0,264	-0,199	-0,206	-0,024	-0,226	1	,883**	0,089	0,301	0,015	-0,301	,328*	0,164	-,420**
	Sig. (2-tailed)	0,819	0,241	0,044	0,091	0,218	0,214	0,884	0,15		<0,001	0,578	0,053	0,928	0,089	0,034	0,299	0,006
	N	42	42	42	42	40	38	38	42	42	42	41	42	39	33	42	42	41
Chol	Pearson Correlation	-0,073	0,235	,315*	,256*	-0,14	-0,183	0,003	0,193	,883**	1	0,113	,483**	0,072	-0,237	0,191	0,091	-,355**
	Sig. (2-tailed)	0,579	0,07	0,014	0,048	0,3	0,182	0,981	0,154	<0,001		0,403	<0,001	0,599	0,117	0,144	0,487	0,006
	N	60	60	60	60	57	55	55	56	42	60	57	60	56	45	60	60	59
CRP	Pearson Correlation	-0,028	0,073	-0,023	-0,042	-0,022	0,046	0,269	-0,021	0,089	0,113	1	-0,034	0,126	-0,093	,259*	0,063	-0,128
	Sig. (2-tailed)	0,831	0,582	0,864	0,755	0,875	0,741	0,051	0,884	0,578	0,403		0,803	0,352	0,555	0,048	0,634	0,34
	N	59	59	59	59	55	54	53	53	41	57	59	57	57	43	59	59	58
TG	Pearson Correlation	0,059	0,185	0,072	0,01	0,238	-0,15	0,129	-,314*	0,301	,483**	-0,034	1	,297*	0,141	-0,058	0,094	0,126
	Sig. (2-tailed)	0,653	0,157	0,587	0,939	0,074	0,275	0,349	0,019	0,053	<0,001	0,803		0,026	0,356	0,662	0,475	0,343
	N	60	60	60	60	57	55	55	56	42	60	57	60	56	45	60	60	59
FPG	Pearson Correlation	0,094	0,052	0,01	0,008	,495**	0,113	0,197	-0,122	0,015	0,072	0,126	,297*	1	,482**	0,103	0,083	0,005
	Sig. (2-tailed)	0,482	0,699	0,942	0,951	<0,001	0,421	0,158	0,39	0,928	0,599	0,352	0,026		0,001	0,443	0,535	0,972
	N	58	58	58	58	55	53	53	52	39	56	57	56	58	44	58	58	57
HBA1c	Pearson Correlation	-0,025	-0,139	-0,002	0,042	,556**	0,092	0,294	-0,007	-0,301	-0,237	-0,093	0,141	,482**	1	-0,021	0,036	0,018
	Sig. (2-tailed)	0,869	0,356	0,989	0,781	<0,001	0,556	0,053	0,964	0,089	0,117	0,555	0,356	0,001		0,89	0,81	0,905
	N	46	46	46	46	45	43	44	45	33	45	43	45	44	46	46	46	46
AHI	Pearson Correlation	-0,104	0,094	0,156	0,141	-0,217	0,04	0,092	-0,064	,328*	0,191	,259*	-0,058	0,103	-0,021	1	0,191	-,554**
	Sig. (2-tailed)	0,422	0,466	0,227	0,274	0,101	0,765	0,498	0,637	0,034	0,144	0,048	0,662	0,443	0,89		0,137	<0,001
	N	62	62	62	62	58	57	56	56	42	60	59	60	58	46	62	62	61
Longest Event	Pearson Correlation	-,353**	,434**	,424**	,286*	0,044	-0,025	0,113	0,056	0,164	0,091	0,063	0,094	0,083	0,036	0,191	1	-,266*
	Sig. (2-tailed)	0,005	<0,001	0,001	0,024	0,743	0,852	0,405	0,682	0,299	0,487	0,634	0,475	0,535	0,81	0,137		0,038
	N	62	62	62	62	58	57	56	56	42	60	59	60	58	46	62	62	61
$minO_2$	Pearson Correlation	-0,134	-0,118	-,364**	-,353**	0,041	0,066	-0,089	-0,172	-,420**	-,355**	-0,128	0,126	0,005	0,018	-,554**	-,266*	1
	Sig. (2-tailed)	0,302	0,364	0,004	0,005	0,761	0,628	0,519	0,209	0,006	0,006	0,34	0,343	0,972	0,905	<0,001	0,038	
	N	61	61	61	61	57	56	55	55	41	59	58	59	57	46	61	61	61

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

Tab. 44: Correlation 1.Measurement AASM II Age>70 Female

		Age	Height	Weight	BMI	DM	MI	Apoplexy	HDL	LDL	Chol	CRP	TG	FPG	HBA1c	AHI	Longest Event	$minO_2$
Age	Pearson Correlation	1	-0,091	-0,125	-0,091	-0,133	-0,096	0,16	0,002	-0,134	-0,154	0,161	0,011	-0,208	-0,154	0,134	-0,168	0,089
	Sig. (2-tailed)		0,503	0,358	0,506	0,358	0,511	0,272	0,988	0,375	0,26	0,237	0,938	0,131	0,312	0,325	0,217	0,52
	N	56	56	56	56	50	49	49	53	46	55	56	56	54	45	56	56	55
Height	Pearson Correlation	-0,091	1	,307*	-0,031	-0,232	0,076	-,305*	0,036	0,072	0,091	0,067	0,025	-,269*	-0,231	-0,027	0,147	0,036
	Sig. (2-tailed)	0,503		0,021	0,822	0,105	0,604	0,033	0,795	0,635	0,51	0,626	0,854	0,049	0,126	0,843	0,279	0,795
	N	56	56	56	56	50	49	49	53	46	55	56	56	54	45	56	56	55
Weight	Pearson Correlation	-0,125	,307*	1	,940**	-0,038	0,032	0,049	-0,002	-0,021	0,203	,295*	,445**	0,151	-0,026	,405**	0,171	-,404**
	Sig. (2-tailed)	0,358	0,021		<0,001	0,792	0,828	0,739	0,989	0,89	0,138	0,027	0,001	0,275	0,866	0,002	0,209	0,002
	N	56	56	56	56	50	49	49	53	46	55	56	56	54	45	56	56	55
BMI	Pearson Correlation	-0,091	-0,031	,940**	1	0,043	0,005	0,176	0,004	-0,061	0,185	,270*	,455**	,270*	0,057	,429**	0,117	-,430**
	Sig. (2-tailed)	0,506	0,822	<0,001		0,769	0,972	0,226	0,976	0,687	0,176	0,044	<0,001	0,048	0,712	0,001	0,392	0,001
	N	56	56	56	56	50	49	49	53	46	55	56	56	54	45	56	56	55
DM	Pearson Correlation	-0,133	-0,232	-0,038	0,043	1	-0,137	-0,02	-0,098	-0,029	-0,135	-0,067	0,2	,647**	,637**	-0,081	0,118	0,02
	Sig. (2-tailed)	0,358	0,105	0,792	0,769		0,346	0,893	0,506	0,856	0,353	0,645	0,165	<0,001	<0,001	0,575	0,413	0,893
	N	50	50	50	50	50	49	49	48	41	49	50	50	48	40	50	50	49
MI	Pearson Correlation	-0,096	0,076	0,032	0,005	-0,137	1	-0,086	-0,251	-0,085	-0,136	0,036	-0,067	-0,124	-0,036	0,064	-0,041	0,075
	Sig. (2-tailed)	0,511	0,604	0,828	0,972	0,346		0,556	0,088	0,602	0,356	0,807	0,648	0,4	0,827	0,665	0,782	0,615
	N	49	49	49	49	49	49	49	47	40	48	49	49	48	40	49	49	48
Apoplexy	Pearson Correlation	0,16	-,305*	0,049	0,176	-0,02	-0,086	1	-0,026	-0,124	-0,071	-0,007	0,153	0,022	0,045	0,212	0,009	-,410**
	Sig. (2-tailed)	0,272	0,033	0,739	0,226	0,893	0,556		0,86	0,447	0,632	0,961	0,295	0,883	0,782	0,144	0,95	0,004
	N	49	49	49	49	49	49	49	47	40	48	49	49	48	40	49	49	48
HDL	Pearson Correlation	0,002	0,036	-0,002	0,004	-0,098	-0,251	-0,026	1	0,101	,640**	-0,126	-,342*	-0,018	-,376*	-0,232	0,071	0,129
	Sig. (2-tailed)	0,988	0,795	0,989	0,976	0,506	0,088	0,86		0,504	<0,001	0,368	0,012	0,901	0,011	0,095	0,611	0,356
	N	53	53	53	53	48	47	47	53	46	52	53	53	51	45	53	53	53
LDL	Pearson Correlation	-0,134	0,072	-0,021	-0,061	-0,029	-0,085	-0,124	0,101	1	,875**	0,142	-0,124	-0,291	-0,194	0,18	,395**	-0,054
	Sig. (2-tailed)	0,375	0,635	0,89	0,687	0,856	0,602	0,447	0,504		<0,001	0,347	0,413	0,055	0,238	0,232	0,007	0,721
	N	46	46	46	46	41	40	40	46	46	45	46	46	44	39	46	46	46
Chol	Pearson Correlation	-0,154	0,091	0,203	0,185	-0,135	-0,136	-0,071	,640**	,875**	1	0,052	-0,005	-0,138	-0,292	0,116	,352*	-0,06
	Sig. (2-tailed)	0,26	0,51	0,138	0,176	0,353	0,356	0,632	<0,001	<0,001		0,705	0,969	0,324	0,054	0,398	0,008	0,669
	N	55	55	55	55	49	48	48	52	45	55	55	55	53	44	55	55	54
CRP	Pearson Correlation	0,161	0,067	,295*	,270*	-0,067	0,036	-0,007	-0,126	0,142	0,052	1	0,163	-0,088	-0,064	,416**	0,059	-,312*
	Sig. (2-tailed)	0,237	0,626	0,027	0,044	0,645	0,807	0,961	0,368	0,347	0,705		0,23	0,528	0,674	0,001	0,667	0,021
	N	56	56	56	56	50	49	49	53	46	55	56	56	54	45	56	56	55
TG	Pearson Correlation	0,011	0,025	,445**	,455**	0,2	-0,067	0,153	-,342*	-0,124	-0,005	0,163	1	,291*	0,221	0,234	0,003	-,315*
	Sig. (2-tailed)	0,938	0,854	0,001	<0,001	0,165	0,648	0,295	0,012	0,413	0,969	0,23		0,033	0,144	0,082	0,98	0,019
	N	56	56	56	56	50	49	49	53	46	55	56	56	54	45	56	56	55
FPG	Pearson Correlation	-0,208	-,269*	0,151	,270*	,647**	-0,124	0,022	-0,018	-0,291	-0,138	-0,088	,291*	1	,699**	0,005	-0,067	0,003
	Sig. (2-tailed)	0,131	0,049	0,275	0,048	<0,001	0,4	0,883	0,901	0,055	0,324	0,528	0,033		<0,001	0,972	0,633	0,985
	N	54	54	54	54	48	48	48	51	44	53	54	54	54	45	54	54	53
HBA1c	Pearson Correlation	-0,154	-0,231	-0,026	0,057	,637**	-0,036	0,045	-,376*	-0,194	-0,292	-0,064	0,221	,699**	1	0,074	0,008	-0,146
	Sig. (2-tailed)	0,312	0,126	0,866	0,712	<0,001	0,827	0,782	0,011	0,238	0,054	0,674	0,144	<0,001		0,629	0,958	0,338
	N	45	45	45	45	40	40	40	45	39	44	45	45	45	45	45	45	45
AHI	Pearson Correlation	0,134	-0,027	,405**	,429**	-0,081	0,064	0,212	-0,232	0,18	0,116	,416**	0,234	0,005	0,074	1	,345**	-,556**
	Sig. (2-tailed)	0,325	0,843	0,002	0,001	0,575	0,665	0,144	0,095	0,232	0,398	0,001	0,082	0,972	0,629		0,009	<0,001
	N	56	56	56	56	50	49	49	53	46	55	56	56	54	45	56	56	55
Longest Event	Pearson Correlation	-0,168	0,147	0,171	0,117	0,118	-0,041	0,009	0,071	,395**	,352**	0,059	0,003	-0,067	0,008	,345**	1	-0,199
	Sig. (2-tailed)	0,217	0,279	0,209	0,392	0,413	0,782	0,95	0,611	0,007	0,008	0,667	0,98	0,633	0,958	0,009		0,145
	N	56	56	56	56	50	49	49	53	46	55	56	56	54	45	56	56	55
$minO_2$	Pearson Correlation	0,089	0,036	-,404**	-,430**	0,02	0,075	-,410**	0,129	-0,054	-0,06	-,312*	-,315*	0,003	-0,146	-,556**	-0,199	1
	Sig. (2-tailed)	0,52	0,795	0,002	0,001	0,893	0,615	0,004	0,356	0,721	0,669	0,021	0,019	0,985	0,338	<0,001	0,145	
	N	55	55	55	55	49	48	48	53	46	54	55	55	53	45	55	55	55

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

Tab. 45: Correlation 1.Measurement AASM II Good/Acceptable Success in Total

		Age	Height	Weight	BMI	DM	MI	Apoplexy	HDL	LDL	Chol	CRP	TG	FPG	HBA1c	AHI	Longest Event	$minO_2$
Age	Pearson Correlation	1	-.348**	-.279**	-.135*	.165**	.258**	0,075	.122*	-.223**	-.174**	-0,036	-.141**	.115*	.122*	-0,076	0,063	-0,015
	Sig. (2-tailed)		<0,001	<0,001	0,01	0,002	<0,001	0,172	0,025	<0,001	0,001	0,508	0,008	0,035	0,037	0,151	0,236	0,774
	N	360	360	360	360	339	336	335	335	297	351	346	350	338	294	360	358	359
Height	Pearson Correlation	-.348**	1	.444**	-0,018	-0,041	0,009	0,008	-.179**	-0,03	-0,059	-0,012	.161**	-0,056	-0,043	0,055	0,062	0,002
	Sig. (2-tailed)	<0,001		<0,001	0,736	0,456	0,868	0,877	0,001	0,608	0,266	0,819	0,002	0,306	0,461	0,294	0,241	0,965
	N	360	360	360	360	339	336	335	335	297	351	346	350	338	294	360	358	359
Weight	Pearson Correlation	-.279**	.444**	1	.883**	.183**	-0,002	0,038	-.295**	-.117*	-.129*	0,054	.190**	.261**	.225**	.399**	.114*	-.388**
	Sig. (2-tailed)	<0,001	<0,001		<0,001	0,001	0,965	0,483	<0,001	0,044	0,016	0,314	<0,001	<0,001	<0,001	<0,001	0,031	<0,001
	N	360	360	360	360	339	336	335	335	297	351	346	350	338	294	360	358	359
BMI	Pearson Correlation	-.135*	-0,018	.883**	1	.219**	-0,013	0,04	-.236**	-.117*	-.113*	0,062	.132*	.313**	.274**	.414**	0,102	-.441**
	Sig. (2-tailed)	0,01	0,736	<0,001		<0,001	0,819	0,466	<0,001	0,045	0,034	0,248	0,014	<0,001	<0,001	<0,001	0,055	<0,001
	N	360	360	360	360	339	336	335	335	297	351	346	350	338	294	360	358	359
DM	Pearson Correlation	.165**	-0,041	.183**	.219**	1	0,022	.195**	-0,039	-.248**	-.186**	0,034	0,034	.578**	.653**	0,07	0,017	-.137*
	Sig. (2-tailed)	0,002	0,456	0,001	<0,001		0,689	<0,001	0,484	<0,001	0,001	0,542	0,531	<0,001	<0,001	0,197	0,755	0,011
	N	339	339	339	339	339	333	334	322	285	334	329	333	325	286	339	337	338
MI	Pearson Correlation	.258**	0,009	-0,002	-0,013	0,022	1	0,004	-0,044	-.205**	-.182**	0,01	0,088	0,09	0,072	.121*	-0,02	-0,032
	Sig. (2-tailed)	<0,001	0,868	0,965	0,819	0,689		0,948	0,431	0,001	0,001	0,854	0,112	0,106	0,226	0,026	0,722	0,563
	N	336	336	336	336	333	336	334	317	280	329	325	328	322	284	336	334	335
Apoplexy	Pearson Correlation	0,075	0,008	0,038	0,04	.195**	0,004	1	-0,047	-0,103	-0,083	0,024	0,04	.218**	.178**	-0,032	.182**	-0,046
	Sig. (2-tailed)	0,172	0,877	0,483	0,466	<0,001	0,948		0,406	0,085	0,134	0,669	0,465	<0,001	0,003	0,555	0,001	0,401
	N	335	335	335	335	334	334	335	317	280	329	324	328	322	285	335	333	334
HDL	Pearson Correlation	.122*	-.179**	-.295**	-.236**	-0,039	-0,044	-0,047	1	0,008	.277**	-0,006	-.424**	-.124*	-.148*	-.147**	0,01	0,064
	Sig. (2-tailed)	0,025	0,001	<0,001	<0,001	0,484	0,431	0,406		0,884	<0,001	0,913	<0,001	0,026	0,012	0,007	0,858	0,241
	N	335	335	335	335	322	317	317	335	297	335	328	334	321	290	335	333	334
LDL	Pearson Correlation	-.223**	-0,03	-.117*	-.117*	-.248**	-.205**	-0,103	0,008	1	.852**	0,005	0	-.172**	-.186**	0,019	0,011	0,007
	Sig. (2-tailed)	<0,001	0,608	0,044	0,045	<0,001	0,001	0,085	0,884		<0,001	0,934	0,997	0,004	0,003	0,751	0,851	0,9
	N	297	297	297	297	285	280	280	297	297	297	291	296	284	257	297	295	296
Chol	Pearson Correlation	-.174**	-0,059	-.129*	-.113*	-.186**	-.182**	-0,083	.277**	.852**	1	0,016	.215**	-0,057	-.158**	-0,02	0,029	-0,001
	Sig. (2-tailed)	0,001	0,266	0,016	0,034	0,001	0,001	0,134	<0,001	<0,001		0,768	<0,001	0,301	0,007	0,709	0,584	0,986
	N	351	351	351	351	334	329	329	335	297	351	343	350	335	293	351	349	350
CRP	Pearson Correlation	-0,036	-0,012	0,054	0,062	0,034	0,01	0,024	-0,006	0,005	0,016	1	0,038	0,082	0,072	0,011	-0,069	-0,069
	Sig. (2-tailed)	0,508	0,819	0,314	0,248	0,542	0,854	0,669	0,913	0,934	0,768		0,488	0,135	0,221	0,844	0,2	0,199
	N	346	346	346	346	329	325	324	328	291	343	346	342	336	288	346	344	345
TG	Pearson Correlation	-.141**	.161**	.190**	.132*	0,034	0,088	0,04	-.424**	0	.215**	0,038	1	.145**	0,085	0,09	-0,02	-0,06
	Sig. (2-tailed)	0,008	0,002	<0,001	0,014	0,531	0,112	0,465	<0,001	0,997	<0,001	0,488		0,008	0,146	0,092	0,709	0,265
	N	350	350	350	350	333	328	328	334	296	350	342	350	334	292	350	348	349
FPG	Pearson Correlation	.115*	-0,056	.261**	.313**	.578**	0,09	.218**	-.124*	-.172**	-0,057	0,082	.145**	1	.754**	.240**	0,063	-.276**
	Sig. (2-tailed)	0,035	0,306	<0,001	<0,001	<0,001	0,106	<0,001	0,026	0,004	0,301	0,135	0,008		<0,001	<0,001	0,25	<0,001
	N	338	338	338	338	325	322	322	321	284	335	336	334	338	290	338	336	337
HBA1c	Pearson Correlation	.122*	-0,043	.225**	.274**	.653**	0,072	.178**	-.148*	-.186**	-.158**	0,072	0,085	.754**	1	.209**	0,095	-.282**
	Sig. (2-tailed)	0,037	0,461	<0,001	<0,001	<0,001	0,226	0,003	0,012	0,003	0,007	0,221	0,146	<0,001		<0,001	0,104	<0,001
	N	294	294	294	294	286	284	285	290	257	293	288	292	290	294	294	292	294
AHI	Pearson Correlation	-0,076	0,055	.399**	.414**	0,07	.121*	-0,032	-.147**	0,019	-0,02	0,011	0,09	.240**	.209**	1	.184**	-.584**
	Sig. (2-tailed)	0,151	0,294	<0,001	<0,001	0,197	0,026	0,555	0,007	0,751	0,709	0,844	0,092	<0,001	<0,001		<0,001	<0,001
	N	360	360	360	360	339	336	335	335	297	351	346	350	338	294	360	358	359
Longest Event	Pearson Correlation	0,063	0,062	.114*	0,102	0,017	-0,02	.182**	0,01	0,011	0,029	-0,069	-0,02	0,063	0,095	.184**	1	-.348**
	Sig. (2-tailed)	0,236	0,241	0,031	0,055	0,755	0,722	0,001	0,858	0,851	0,584	0,2	0,709	0,25	0,104	<0,001		<0,001
	N	358	358	358	358	337	334	333	333	295	349	344	348	336	292	358	358	357
$minO_2$	Pearson Correlation	-0,015	0,002	-.388**	-.441**	-.137*	-0,032	-0,046	0,064	0,007	-0,001	-0,069	-0,06	-.276**	-.282**	-.584**	-.348**	1
	Sig. (2-tailed)	0,774	0,965	<0,001	<0,001	0,011	0,563	0,401	0,241	0,9	0,986	0,199	0,265	<0,001	<0,001	<0,001	<0,001	
	N	359	359	359	359	338	335	334	334	296	350	345	349	337	294	359	357	359

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

Tab. 46: Correlation 1.Measurement AASM II No Therapy Success in Total

		Age	Height	Weight	BMI	DM	MI	Apoplexy	HDL	LDL	Chol	CRP	TG	FPG	HBA1c	AHI	Longest Event	$minO_2$
Age	Pearson Correlation	1	-.418*	-0,111	0,062	0,211	0,249	0,225	0,059	-0,102	-0,304	-0,153	-0,293	0,271	.615**	-0,113	-0,006	-0,165
	Sig. (2-tailed)		0,047	0,615	0,78	0,347	0,275	0,327	0,795	0,728	0,17	0,496	0,186	0,247	0,009	0,609	0,977	0,463
	N	23	23	23	23	22	21	21	22	14	22	22	22	20	17	23	23	22
Height	Pearson Correlation	-.418*	1	0,32	-0,143	0,024	0,136	0,276	-0,197	-0,303	-0,242	0,388	0,024	-0,256	-0,303	0,362	0,13	-0,035
	Sig. (2-tailed)	0,047		0,136	0,516	0,915	0,556	0,226	0,381	0,292	0,278	0,074	0,917	0,277	0,237	0,089	0,554	0,876
	N	23	23	23	23	22	21	21	22	14	22	22	22	20	17	23	23	22
Weight	Pearson Correlation	-0,111	0,32	1	.888**	0,084	0,289	0,032	-0,075	0,213	0,315	-0,219	0,251	0,238	0,207	0,232	-0,099	-0,069
	Sig. (2-tailed)	0,615	0,136		<0,001	0,712	0,203	0,89	0,739	0,465	0,154	0,328	0,259	0,311	0,425	0,287	0,653	0,761
	N	23	23	23	23	22	21	21	22	14	22	22	22	20	17	23	23	22
BMI	Pearson Correlation	0,062	-0,143	.888**	1	0,021	0,186	-0,088	0,018	0,437	.484*	-0,385	0,274	0,358	0,333	0,09	-0,135	-0,08
	Sig. (2-tailed)	0,78	0,516	<0,001		0,925	0,418	0,704	0,936	0,118	0,022	0,076	0,218	0,121	0,191	0,682	0,541	0,723
	N	23	23	23	23	22	21	21	22	14	22	22	22	20	17	23	23	22
DM	Pearson Correlation	0,211	0,024	0,084	0,021	1	1.000**	-0,105	-0,034	-0,297	-0,381	-0,071	-0,223	.499*	.702**	-0,237	-0,323	0,162
	Sig. (2-tailed)	0,347	0,915	0,712	0,925		<0,001	0,65	0,883	0,325	0,088	0,759	0,332	0,025	0,002	0,288	0,142	0,484
	N	22	22	22	22	22	21	21	21	13	21	21	21	20	17	22	22	21
MI	Pearson Correlation	0,249	0,136	0,289	0,186	1.000**	1	-0,105	-0,034	-0,297	-0,381	-0,071	-0,223	.499*	.702**	-0,183	-0,235	0,159
	Sig. (2-tailed)	0,275	0,556	0,203	0,418	<0,001		0,65	0,883	0,325	0,088	0,759	0,332	0,025	0,002	0,427	0,306	0,503
	N	21	21	21	21	21	21	21	21	13	21	21	21	20	17	21	21	20
Apoplexy	Pearson Correlation	0,225	0,276	0,032	-0,088	-0,105	-0,105	1	-0,14	-0,161	0,011	0,198	0,207	-0,071	-0,042	0,154	0,19	0,082
	Sig. (2-tailed)	0,327	0,226	0,89	0,704	0,65	0,65		0,544	0,6	0,962	0,39	0,367	0,767	0,873	0,506	0,409	0,73
	N	21	21	21	21	21	21	21	21	13	21	21	21	20	17	21	21	20
HDL	Pearson Correlation	0,059	-0,197	-0,075	0,018	-0,034	-0,034	-0,14	1	-0,26	0,187	-0,318	-0,387	-0,159	-0,29	-0,25	.565**	-0,108
	Sig. (2-tailed)	0,795	0,381	0,739	0,936	0,883	0,883	0,544		0,369	0,406	0,15	0,075	0,504	0,258	0,262	0,006	0,64
	N	22	22	22	22	21	21	21	22	14	22	22	22	20	17	22	22	21
LDL	Pearson Correlation	-0,102	-0,303	0,213	0,437	-0,297	-0,297	-0,161	-0,26	1	.911**	-0,013	0,371	0,565	0,38	0,152	-0,073	-0,167
	Sig. (2-tailed)	0,728	0,292	0,465	0,118	0,325	0,325	0,6	0,369		<0,001	0,964	0,192	0,055	0,279	0,603	0,804	0,585
	N	14	14	14	14	13	13	13	14	14	14	14	14	12	10	14	14	13
Chol	Pearson Correlation	-0,304	-0,242	0,315	.484*	-0,381	-0,381	0,011	0,187	.911**	1	-0,167	.545**	0,065	-0,136	0,076	0,196	-0,113
	Sig. (2-tailed)	0,17	0,278	0,154	0,022	0,088	0,088	0,962	0,406	<0,001		0,458	0,009	0,786	0,604	0,737	0,381	0,626
	N	22	22	22	22	21	21	21	22	14	22	22	22	20	17	22	22	21
CRP	Pearson Correlation	-0,153	0,388	-0,219	-0,385	-0,071	-0,071	0,198	-0,318	-0,013	-0,167	1	-0,08	-0,16	-0,12	0,215	-0,033	-0,038
	Sig. (2-tailed)	0,496	0,074	0,328	0,076	0,759	0,759	0,39	0,15	0,964	0,458		0,725	0,501	0,646	0,336	0,885	0,869
	N	22	22	22	22	21	21	21	22	14	22	22	22	20	17	22	22	21
TG	Pearson Correlation	-0,293	0,024	0,251	0,274	-0,223	-0,223	0,207	-0,387	0,371	.545**	-0,08	1	0,158	0,076	0,191	-0,181	0,137
	Sig. (2-tailed)	0,186	0,917	0,259	0,218	0,332	0,332	0,367	0,075	0,192	0,009	0,725		0,505	0,773	0,394	0,419	0,555
	N	22	22	22	22	21	21	21	22	14	22	22	22	20	17	22	22	21
FPG	Pearson Correlation	0,271	-0,256	0,238	0,358	.499*	.499*	-0,071	-0,159	0,565	0,065	-0,16	0,158	1	.699**	0,165	-.472*	-0,09
	Sig. (2-tailed)	0,247	0,277	0,311	0,121	0,025	0,025	0,767	0,504	0,055	0,786	0,501	0,505		0,002	0,488	0,036	0,715
	N	20	20	20	20	20	20	20	20	12	20	20	20	20	17	20	20	19
HBA1c	Pearson Correlation	.615**	-0,303	0,207	0,333	.702**	.702**	-0,042	-0,29	0,38	-0,136	-0,12	0,076	.699**	1	-0,107	-0,289	-0,066
	Sig. (2-tailed)	0,009	0,237	0,425	0,191	0,002	0,002	0,873	0,258	0,279	0,604	0,646	0,773	0,002		0,684	0,26	0,801
	N	17	17	17	17	17	17	17	17	10	17	17	17	17	17	17	17	17
AHI	Pearson Correlation	-0,113	0,362	0,232	0,09	-0,237	-0,183	0,154	-0,25	0,152	0,076	0,215	0,191	0,165	-0,107	1	0,126	-.562**
	Sig. (2-tailed)	0,609	0,089	0,287	0,682	0,288	0,427	0,506	0,262	0,603	0,737	0,336	0,394	0,488	0,684		0,567	0,006
	N	23	23	23	23	22	21	21	22	14	22	22	22	20	17	23	23	22
Longest Event	Pearson Correlation	-0,006	0,13	-0,099	-0,135	-0,323	-0,235	0,19	.565**	-0,073	0,196	-0,033	-0,181	-.472*	-0,289	0,126	1	-.525*
	Sig. (2-tailed)	0,977	0,554	0,653	0,541	0,142	0,306	0,409	0,006	0,804	0,381	0,885	0,419	0,036	0,26	0,567		0,012
	N	23	23	23	23	22	21	21	22	14	22	22	22	20	17	23	23	22
$minO_2$	Pearson Correlation	-0,165	-0,035	-0,069	-0,08	0,162	0,159	0,082	-0,108	-0,167	-0,113	-0,038	0,137	-0,09	-0,066	-.562**	-.525*	1
	Sig. (2-tailed)	0,463	0,876	0,761	0,723	0,484	0,503	0,73	0,64	0,585	0,626	0,869	0,555	0,715	0,801	0,006	0,012	
	N	22	22	22	22	21	20	20	21	13	21	21	21	19	17	22	22	22

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).