Abs.CA.01

Effect of Alternate Nostril Yoga Breathing on Autonomic and Respiratory Variables

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Objective : The present study was conducted to see the effect of alternate nostril yoga breathing on autonomic variables before, during and after the practice.

Method : Fifteen healthy male participants age ranged between 20-30 years were selected for the study. They were not taking any medication and residing in a yoga center located in northern India. Data were acquired on the same participants on two different days. Participants were alternately allocated to two practices, viz., alternate nostril yoga breathing (*anuloma-viloma*) and breath awareness. The two interventions were given on two different days for each participant and allocation to either intervention was alternate. The total time for the interventions was 28 minutes. During *anuloma-viloma* participants practiced alternate nostril yoga breathing (at 6-10 rounds/min) as three epochs of five minutes each. After each five-minute period there was a one-minute gap during which they breathed normally. Breath awareness was the alternate intervention. During this practice the participants were asked to sit quietly, being aware of their breath without manipulating their breathing. Blood pressure, heart rate variability and respiration rate were assessed before, during and after the intervention.

Results : Data was analysed by using RM-Anova. There were two with in subject factors i.e., Session with two level (ANYB and BAW) and States with four levels (Pre, D1, D2, D3 and Post). There was a significant decrease in systolic blood pressure following ANYB in D1 ($P<0.001$), D2 ($P<0.001$), D3 ($P<0.001$) and in post ($P<0.001$) while compared with pre. Also there were significant changes in systolic blood pressure after BAW in D1 ($P<0.01$), D2 ($P<0.01$), and D3 ($P<0.01$) while compared with pre. Also respiration rate was significantly decreased ($P<0.01$) after ANYB and BAW. There were no changes observed in frequency domain of Heart rate variability.

Conclusion : Both breathing techniques, Alternate nostril yoga breathing and breath awareness may be useful in prevention and management of hypertension.

Abs.CA.02

Effect of Music on Post-Exercise Recovery in Young Adults.

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Objective : Music is a well known relaxation technique from times immemorial. This study was carried out for evaluation of effect of music on post-exercise recovery time following moderate exercise with Harvard step test in young healthy volunteers.

Methodology : 50 normal young healthy medical students aged between 17 to 21 years were taken as subjects. They were subjected to moderate exercise by Harvard step test on three consecutive days. They were allowed to rest in silence on the first day, rest by

hearing slow music on second day and rest with fast music on third day. Parameters such as Pulse rate, systolic blood pressure and diastolic blood pressure were measured at predetermined intervals.

Results : Data was statistically analysed using student t-test and result showed that with music, recovery time of systolic and diastolic blood pressure and pulse rate were significantly faster when compared to post-exercise recovery of all these parameters with no music. Results also showed that post-exercise recovery with slow music was faster when compared to that with fast music.

Conclusion : The present study supported the hypothesis that relaxation with music after a bout of physical exercise caused faster recovery of physiological parameters in comparison with relaxation in silence. Music has the potential to reduce physiological indicators of anxiety. Music reduces muscular and mental tension and thereby decreases sympathetic stimulation. The heart rate and blood pressure returned to base line faster while listening to slow music when compared to fast music. Slow music reduces the arousal, leaving the subject in a state of relaxation. This study show that slow music can be used as one of the best relaxation tools to improve the work efficiency of the employees at the work place. It is beneficial part of this study.

Abs.CA.03

Effect of 12 Week Yoga Therapy on Cardiac Autonomic Functions in Patients of Essential Hypertension.

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Objective : To study the effect of 12 week yoga therapy on cardiac autonomic functions in patients of essential hypertension.

Method : Patients with essential hypertension from JIPMER outpatient department and satisfying the study criteria, after obtaining a written informed consent, were randomly divided into two groups: yoga group (n=34, who underwent yoga training along with antihypertensive drugs) and control group (n=36, antihypertensive drugs only). Supervised yoga training consisting of static postures, breathing and relaxation techniques was given for a period of 12 weeks, three times a week for the yoga group. Lifestyle modifications like dietary pattern, physical activity, cessation of smoking and alcohol were advised to both the groups. Anthropometric parameters, resting blood pressure (BP) and autonomic functions [short-term spectral analysis of heart rate variability (HRV), heart rate and BP response to standing, deep breathing and isometric handgrip] were recorded in all subjects before and after the study period. P value <0.05 was considered significant.

Results : There was a significant reduction in resting BP in yoga group. On analysis of HRV, there was a significant increase in parasympathetic activity and decrease in sympathetic activity in yoga group. In reactivity tests, though an improvement was noticed (increase in vagal modulation, decrease in sympathetic reactivity) the results were not statistically significant.

Conclusion : Twelve week yoga therapy can

improve cardiac autonomic functions in patients of essential hypertension if practiced regularly along with other lifestyle modifications and drugs. Therefore, yoga therapy especially breathing and relaxation techniques can be prescribed along with antihypertensive drugs in hypertensive patients to restore sympathovagal balance.

Abs.CA.04

Immediate Effect of Suryanadi and Chandranadi Pranayam on Short Term Heart Rate Variability in Healthy Young Volunteers

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Objective : To study the immediate Effect of Suryanadi and Chandranadi Pranayam on Heart Rate Variability in Healthy Young Volunteers.

Method : The present study was conducted on 11male volunteers 20-30yrs. Their height, weight were recorded and BMI was calculated. Volunteers were assigned to a sequence randomly. Each volunteer was taught both suryanadi (SNP) and chandranadi pranayam (CNP) by trained yoga teacher and made to practice under direct supervision until they were familiar. The procedures and recordings were carried out in lying down posture for all volunteers between 4-6.30 pm in ACYTER lab, JIPMER. Heart rate variability (HRV) was recorded by using BIOHARNESS AcqKnowledge 4.1 version and analyzed by Kubios HRV 2.00 software. Basal resting parameters and HRV were recorded for 5 minutes after that. SNP (only right nostril breathing) was performed in six cycles per minute (each cycle consists of 5 seconds for each inspiration and expiration) for 5 minutes followed by 5 min rest. Three such sessions (before, during and after) HRV were recorded. The same procedure and recording ware followed for CNP (left nostril breathing only). Appropriate statistical analysis was done using SPSS version 16 and the level of statistical significance is considered at a P value < 0.05.

Results : The results of our study was much in accordance with the previous studies. The time domain analysis of SNP revealed an increased heart rate with a decreased RMSSD, the index of short term HRV. However the SDNN which is considered the index of long term HRV increased. Also, in the frequency domain analysis there is an increased LF power and decreased HF power. The index of sympathovagal balance as reflected by LF/HF ratio increased i.e from 1.8 to 2.2 after the intervention. All the observation showed that SNP is sympathomimetic. In CNP, the time domain analysis of HRV revealed a decreased heart rate and an increased pNN50. The frequency domain analysis revealed an increased HF power with decreased LF/HF ratio i.e from 2.1 to 1.5. The observations of CNP clearly indicated that CNP is an activator of the parasympathetic activity.

Conclusion : "SNP increase the sympathetic activity and CNP increases the parasympathetic activity and these can be appropriately advocated in many chronic cardiovascular diseases where the autonomic imbalance is

one of the primary derangements.

Abs.CA.05

Effect of Two Yogic Breathing Techniques on Oxygen Saturation

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Objective : The present study was conducted to assess blood oxygen saturation pre, during and post high frequency yoga breathing (*Kapalabhati*) and Breath awareness.

Method : Participants were 29 healthy male volunteers with ages ranging between 17 and 32 years (group mean ± S.D., 22.5 ± 3.6 years). They were all working as security personnel in a Yoga and Ayurveda center in the north of India. Their minimum experience of yoga breathing practice was 3 months. Two breathing exercises were high frequency yoga breathing (HFYB) or *Kapalabhati* and Breath awareness (BAW). Each participant was assessed using MP-150 (BIOPAC, U.S.A.) on two sessions (HFYB and BAW) each lasting 33 minutes. The sequence of practice was changed for every alternate participant. Repeated measures analyses of variance (ANOVA) with Bonferroni adjustment post-hoc analyses was done to compare During and Post data with Pre data using PASW version 18.0.

Results : During High frequency yoga breathing, there was a significant increase in oxygen saturation compared to pre ($P<0.01$) and after high frequency yoga breathing, there was a significant decrease in oxygen saturation compared to pre ($P<0.01$). There was no significant difference during and after breath awareness on oxygen saturation.

Conclusion : This result may be due to a reduction of carbon dioxide level in the blood which may facilitate oxygen binding with hemoglobin as HFYB or *Kapalabhati* can cause carbon dioxide washout.

Abs.CA.06

Cardioresiratory & Haematological Changes after Pranayama Training in Healthy Young Adults

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Aims & Objectives : To study following Cadiorespiratory & haematological parameters before & after 12 weeks pranayama training & to compare them.

1] Heart rate

2] Systolic & diastolic blood pressure

3] Breath Holding Time

4] Hemoglobin count

5] R. B. C. count

6] Total W. B. C. Count

7] Platelet count

Materials & Methods : Study was conducted on 40 M.B.B.S. students.

The Pranayama practice consisted of Prayer, Nadishuddhi, Bhastrika, Anulom-vilom, Suryabhedan, Kapalbhati, Bhramari, and Omkar Recitation for 45 minutes in early

morning & was carried out 6 days/week for 12 weeks duration. Heart rate was taken by measuring R-R interval in ECG. Blood pressure was measured with the help of mercury sphygmomanometer. BHT was taken with the help of stop watch. Mean of the three readings was taken as a final reading. Readings of haematological parameters were taken with automated three cell counter method. Data analysis was done by applying students paired t-test.

Results : There was significant decrease in heart rate, systolic blood pressure & increase in BHT after pranayama. There was no significant change in diastolic blood pressure. After short duration pranayama practice there was significant change in hemoglobin count, R. B. C. Count & no significant change in W. B. C. Count & platelet count.

Conclusion : From our study it can be concluded that regular pranayama practice has impact on haemotopoeisis through its impact on neuroendocrine system. Pranayama practice improves cardiac autonomic status & pulmonary functmion.

Abs.CA.07

Immediate Effect of "AUM" Mantra Chanting on Electroencephalographic Pattern, Heart Rate and Galvanic Skin Conductance Levels in Medical Students

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Objective **:** The objective of this study was to evaluate the immediate effect of "aum" mantra chanting for five minutes in untrained subjects on electroencephalographic pattern, heart rate and galvanic skin conductance levels.

Method : Electroencephalogram and heart rate recordings were taken after five minutes of rest before, during and after 5 minutes of "aum" chanting, in 15 medical students.

Results : Resting pattern of electroencephalogram showed a basal beta wave pattern of 18-30 Hz. During 5 minutes of "aum" chanting all the subjects showed alpha wave pattern which increased in amplitude and slowed down in frequency and extended to all the channels. In 5 subjects it was interspersed by short bursts of high voltage (100-300 microvolts) theta waves at 5-7 cycles per second predominantly in the left frontal regions and spread to all other leads and other 5 subjects showed short bursts of large amplitude delta waves during the process of "aum" chanting .

Conclusion **:** As the results showed alpha rhythms and slow wave patterns of theta and delta in electroencephalogram with a significant increase in heart rate and decrease in galvanic skin resistance values during chanting, it is concluded there is a combination of mental relaxation and mental alertness during "aum" chanting.

Abs.CA.08

Effect of Yoga and Physical Exercise on the Physical Fitness of School Children

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Objective : The present study aim at evaluating the effect of 60 days of yoga and physical exercise training on physical fitness of school children.

Method **:** In this study 49 students with ages ranging between 9 and 12 years. (Group Mean ± S.D. age, 10.5±1.3 years) were randomized to a yoga group and a physical exercise group using a random number table. The yoga group practiced yoga for 45 minutes daily for five days a week for three months and the physical exercise group practiced physical activity during that time. Physical fitness of the children was assessed using the Eurofit Physical fitness battery before and after three months of intervention. Repeated measures analyses of variance (ANOVA) followed by *post-hoc* analyses with Bonferroni adjustment were done to compare data recorded before and after three months with pre data, using PASW Version 18.0.

Results : When after intervention data were compared with before intervention data there was a significant increase in the number of sit-ups completed in 30 seconds in both yoga ($P<0.001$) and physical exercise group ($P<0.001$), a significant reduction in time taken to complete a plate tapping task in both yoga ($P<0.001$) and physical exercise group ($P<0.01$) and a significant increase in body mass index in both yoga ($P<0.001$) and physical exercise group ($P<0.05$) was also observed.

Conclusion : Sixty days of yoga practice and of physical activity can improve some of the variables of physical fitness in children, comparably.

Abs.CA.09

Effect of Yoga Training on Physiological Parameters and ECG Changes

Kedar Suresh Kulkarni

Objective : The goal of yoga practice is relaxation even while working. Yoga has shown many beneficial effects including reduction in anxiety levels and beneficial effects in patients with ECG abnormality and ECG changes. Yoga is a powerful tool in controlling a number of diseases like hypertension psychological disorders and diabetes mellitus.

Method : 50 patients with heart disease with ECG changes 50 psychotic patients 50 diabetics and 50 normal subjects were chosen and they underwent three months of yoga training they were assessed before and after yoga sessions. We obtained results as shown in observation tables

Results : Parameters Initial Values Values after 3 months

Body wt	60+1	57+1	
Systolic BP	127+2	117+1	
Diastolic BP	81+1	75+1	
Heart rate	72+1	68+1	
ECG changes	Ectopic	Reduced	– Statistical significant
Psychiatric doses	More	Doses reduced	– Statistical significant
Blood sugar	200+20	120+10	– Statistical significant

$P<0.05$ in all the cases, paired t test two tailed

Conclusion : This study has shown following effects there are tremendous beneficial effects after yoga training significant reduction in body weight, psychiatric dose requirements, blood sugar levels and significant reductions in ECG changes with abolition of ectopics.

Abs.CA.10

Study of Autonomic Functions in Raja Yoga Meditators

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Objective : "The study was conducted to observe the autonomic functions in Raja yoga meditators and controls.

Method : Sympathetic function tests (galvanic skin resistance,cold pressor response, handgrip test) and parasympathetic function tests (standing/lying ratio,30:15 RR ratio, valsalva ratio,expiration/inspiration ratio) were carried out in 25 controls and 25 participants doing Bramha Kumaris (BK) Raja yoga meditation for more than 5 years.

Results : "From the study it was observed that standing/lying ratio,30:15 RR ratio,valsalva ratio, expiration/inspiration ratio and galvanic skin resistance were significantly higher in Raja yoga meditators ($P<0.001$) than controls.30:15RR ratio was not significant.The difference in the mean values of systolic & diastolic blood pressure response to handgrip between study group & control group was statistically significant (mean rise in systolic blood pressure 19.44 vs 22.88 mmHg) ($P<0.01$) & (mean rise in diastolic BP 22.08 vs 16.8 mmHg) ($P<0.001$). Blood pressure response to cold pressor test was not significant for systolic blood pressure but was significant for diastolic blood pressure (mean rise in diastolic BP10.48 vs 12.08 mmHg) ($P<0.001$).

Conclusion : These results indicate that parasympathetic activity increases and sympathetic activity decreases with Raja yoga meditation(BK) practice for more than 5 years.

Abs.CA.11

Effect of Yoga on Cardio-Respiratory Responses in Female Subjects of Manipur.

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Objective : The study was aimed at assessing the effect of a set of yoga practices on cardio-respiratory responses in normal adult indigenous females of Manipur as very few documented data is available from the north east region of India.

Method : The study was conducted on 31 normal indigenous females of Manipur in the age group 20 to 50 years. Padmasana and shavasana were performed for 30 mins/day, six days/week for 3 months under the expert guidance. The cardiovascular status was assessed by recording blood pressure by a mercury sphygmomanometer (Diamond), heart rate (HR), 30:15 ratio and Valsalva ratio

by an ECG machine (Cardiart108T/MK) and respiratory function by recording forced expiratory volume in 1st Second (FEV_1) and peak expiratory flow rate (PEFR) by a Medspiror (Recorder's and Medicare System) before and after 3 months of regular yoga practice. Paired 't' test was used to find significance of the findings.

Results : The mean HR, systolic and diastolic blood pressure were reduced significantly from 80.84±8.08 to 71.10±5.15 (P<0.001), 123.87±7.15 to 115.42±5.84 (P<0.001) and 81.35±5.01 to 73.48±4.67 (P<0.001) respectively. The mean 30:15 ratio 1.16±0.77 and Valsalva Ratio 1.37±0.18 were increased significantly to 1.34±0.212 (P<0.001) and 1.66±0.28 (P<0.001) respectively. Mean FEV_1 (1.91±0.36), and mean PEFR (6.12±2.13) were increased significantly to 2.29±0.32 (P<0,001)and 7.48±2.29 (P<0.001) respectively.

Conclusion : The cardio-respiratory functions showed significant improvement after 3 months of yoga practice in normal female subjects of Manipur. The findings will have significant impact on physical health among females in a conflict area like Manipur.

Abs.CA.12

Effect of Bhramari Pranayama on Volunteers Having Cardiovascular Hyper-reactivity to Cold Pressor Test

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Objective : Objective of the present study was to investigate whether regular practice of Bhramari Pranayama for 3 months can reduce the cardio-vascular hyper-reactivity induced by cold pressor test.

Method : Total 54 healthy first year medical students [age group 18 to 24 yrs] who were sedentary and nonsmoker with no cardiorespiratory disorders were included in the study. Study design chosen was pre and post test and we included only the experimental group. Cold Pressor test was performed by immersing the hand in cold water up to the wrist for one minute (cold stress). An elevation above the basal level of more than 20 mm of Hg in systolic or of more than 15 mm in diastolic was considered as hyper-reactive response. We made subjects to perform Bhramari Pranayama for three months.

Results : 21 volunteers hyper-reactive to cold pressor test 3 months of regular practice of Bhramari Pranayama reduced to 04 (H" 81% reduction). Initially mean systolic BP after 1min cold stress was 139± 8.83 mmHg which was reduced to 134±5 mmHg (t = 2.94, P<0.01), while diastolic blood pressure reduced from 91±7.5 mmHg to 88±4.42 mmHg (t = 4.74, P<0.01). Initially the rise in systolic blood pressure due to cold stress (Hand immersed at 30– 40 C for one minute) was 19.24±4.17 mmHg that became 15.71±2.85 mmHg (t = 6.4, P<0.01), and initial rise in diastolic blood pressure was 14.67±2.85 mmHg which became 11.62±1.86 mmHg (t = 5.6, P< 0.01) after regular practice of Bhramari Pranayama for 3 months.

Conclusion : We concluded that regular practice of Bhramari Pranayama for 3 months reduced the cardiovascular hyper-reactivity to cold pressor test in subjects who were

hyper-reactive to cold stress, possibly by inducing parasympathetic predominance and corticohypothalamo medullary inhibition.

Abs.CA.13

Blood Pressure Changes During Indian Classical Singing

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Objectives : To study the changes of blood pressure during Indian classical singing.

Methods : In the present study, 25 students of degree college, R.K.M.V. shimla who are learning vocal music were involved. Subjects having the age between 16 and 40 years and who were singing with minimum duration of two years in college were only selected. Those who were anemic, hypertensive and hypotensive and even having family history of hypertension were excluded.

Subjects were made to sit in crossed leg position and resting blood pressure was recorded in the right arm three times with an interval of five minutes. Subjects were asked to sing the Yaman Rag and blood pressure was recorded after 1st, 2nd and 5th minute of singing. The same procedure was performed three times with an interval of five minutes.

Results : On statistical analysis, it was observed that after 1st, 2nd and 5th minute of singing both systolic and diastolic blood pressure were raised significantly as compared to their resting value. Change in diastolic blood pressure is more prominent as compared to systolic blood pressure. Although quantitative change of systolic and diastolic blood pressure varies in different subjects and depends on rise of intra-thoracic pressure.

Conclusion : Indian classical singing involves rise of blood pressure which is directly related to the rise in intra-thoracic pressure. Continuous singing for long duration may cause risk for cardio-vascular changes and regular follow up of professional singers is recommended.

Abs.CA.14

Physiological Effect of Yogic Practices on Young Indian Students : A Comparative Approach

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Objective : To compare body mass index (BMI), physical characteristics, aerobic and pulmonary capacities of Yoga Diploma Course Students (YS), who practiced yoga for one year prior to the study, with Research Fellows (RF), who never practiced yoga.

Method : Sixty eight (N=68) healthy young volunteers within the age range of 23–29 years participated in the study, which included 19 male (n1=19) & 17 female (n2=17) YS and 20 male (n3=20) & 12 female (n4=12) RF. Standing height, weight, dynamic lung

function tests [including forced vital capacity (FVC), forced expiratory volume in 1st second (FEV1), maximum voluntary ventilation (MVV) and peak expiratory flow rate (PEFR)], hand grip strength (HGS), back leg strength (BLS) and maximal aerobic capacity (VO2max) were recorded. BMI was calculated using standard formula.

Results : VO^2max of male and female volunteers from YS was significantly higher ($P<0.05$ & $P<0.001$ respectively) than RF. MVV of male and female participants from YS was significantly higher (both $P<0.05$) than RF. PEFR of female YS was significantly higher ($P<0.05$) than female RF; though, PEFR values of male YS and RF did not show any significant difference. BLS of male and female volunteers from YS was significantly higher (both $P<0.05$) than RF. No significant difference was observed in BMI, FVC, FEV1 and HGS between male and female YS and RF.

Conclusion : The present study showed better physical performance in YS as compared to RF. It could be recommended that yoga as a physical fitness regime should be considered for any health benefit programme.

Abs.CA.15

Effect of Short Term Yoga Practices on Cardio-pulmonary Efficiency Parameters

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Aims and Objectives : To Study the effect of short term Yoga practices on cardio-pulmonary efficiency parameters like pulse rate, blood pressure, respiratory rate, pulmonary function tests (FVC, FEV_1%, MVV, PEFR) and 40 mm endurance time.

Materials and Methods : The study was conducted on 60 Ist M.B.B.S. students (40 males, 20 females) of age group 17-20 years. The parameters taken were pulse rate, blood pressure, respiratory rate, pulmonary function tests (FVC, FEV_1%, MVV, PEFR) and 40 mm endurance time.The students were trained by experts from Yoga Kendra. The students performed the Yoga Practice in the evening for one hour, six days in a week, for 12 wks under expert's observation. The Yoga practice consisted of Prayer, Omkar recitation, asanas, pranayama and breathing exercises. Student 't' test was used to compare pre & post Yoga assessment.

Results : There was significant decrease in pulse rate,blood pressure and respiratory rate. There was significant improvement in FVC, FEV_1 %, MVV, PEFR & 40 mm Hg endurance time.

Conclusion : A marked improvement can occur in various cardio-pulmonary efficiency parameters after short term Yoga practice. By extending these results, we suggest that Yoga practice may be applied as an alternative therapy or as adjunct to conventional therapy in diseases like bronchial asthma and essential hypertension.

Abs.CA.16

Effect of Anapanasati Meditation on Cardiovascular Parameters and Lipid Profile

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Objective : Because of growing evidence of stress as a major contributing factor for cardiovascular diseases, techniques of meditation are being increasingly used and studied. Our present study was done to evaluate the effect of Anapanasati meditation on cardiovascular parameters and lipid profile.

Method : In this study 30 meditators and 30 non meditators in the age group 45 to 60 yrs of either sex with no known cardiovascular disorders were selected. Meditators practiced anapanasati meditation every morning for one hour, for more than one year and non meditators had not done any kind of meditation or any relaxing technique. Cadiovascular parameters - Blood pressure and heart rate were recorded after one hour meditation in Sri Murugarajendra Meditation Center, Davanagere, Karnataka. For Lipid Profile, 5ml of fasting blood drawn and serum was separated by centrifugation. Total cholesterol, High Density Lipoprotein (HDL), Low Density Lipoprotein (LDL) and Triglycerides were estimated by semiautoanalyser using specific reagents. Non meditators were tested similarly after 15 min of rest. Data was subjected to statistical analysis. Student's unpaired t-test was used to compare both the groups. Level of significance was set at $P<0.05$.

Results : Heart rate, Systolic blood pressure, Diastolic blood pressure, Total cholesterol, HDL, LDL, Triglycerides were significantly low in meditators compared to non meditators.

Conclusion : This study suggests that meditation lowers blood pressure and heart rate and improves lipid profile. Thus meditation can be used as an inexpensive tool to reduce cardiovascular risk which provides psychophysiologic stimuli to improve most of the cardiovascular functions and possibly result in improved management of their daily stress.

Abs.CA.17

The Effect of Pranayama on Serum Malondialdehyde Levels in Normal Healthy Volunteers

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Objective : The present study was undertaken to find out the effect of Pranayama breathing exercises on stress reduction, by assessing the fasting serum malondialdehyde levels, an end product of lipid peroxidation, at the beginning & at the end of two months Pranayama training camp, through a self controlled trial, at Government Medical College and Hospital, Aurangabad, in the Department of Physiology.

Method : Total 74 healthy subjects of both sexes were included in the study with age group of 45-55 years, who have practiced Pranayama for one hour daily for two months. Fasting venous blood samples were collected on the first day & last day of the camp.

Results : The serum concentration of malondialdehyde decreased from 3.79±0.75 nmoles/ml on first day of camp to

1.69±0.55nmoles/ml on last day of camp (P<0.001).

Conclusion : The results of present study indicate that Pranayama can be cost effective & excellent technique to relieve stress & stress related disorders like type obesity, hypertension, type-A personality disorder and psychoses, diabetes mellitus; cardio vascular heart diseases.

Abs.CA.18

Effect of Rajyoga Meditation on Physical Performance in Badminton Players with Special Focus on Blood Lactate Level

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Objective : To see the effect of performance with Rajyoga meditation in badminton player's.

Method : 30 badminton player's were enrolled for the study based on inclusion criteria and assessed before and after practicing Rajyoga meditation. Blood samples were collected and plasma lactate was assessed with the help of semiautoanalyzer. In same manner physical parameters like BMI was calculated by weight(kg)/height (m^2), pulse rate by palpation of left radial artery, blood pressure by sphygmomanometer, before and after 8 weeks of Rajyoga meditation.

Results : Values of BMI from 23.96±3.1 to 23.66±2.83 do not show any significant change. But significant decrease was seen in systolic blood pressure from 123.93±4.77 to 122.2±2.79 (P<0.01), diastolic blood pressure from 81.73±4.51 to 80.26± 3.05 (P<0.05), pulse rate from 84.7±4.32 to 83.7±3.6 (P<0.05) and blood lactate levels from 12.24±2.95 to 11.32±2.39 (P<0.05).

Conclusion : The results obtained emphasizes the beneficial effect of Rajyoga meditation. The decrease in lactate level obtained certainly decreases the degree of muscle fatigue and improves muscle performance. Further studies need to be conducted for a larger sample size.

Abs.CA.19

Effect of Right Nostril Yoga Breathing and Breath Awareness on Energy Expenditure

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Objective : The present study was conducted to assess energy expenditure pre, during and post two selected yogic breathing exercises.

Method : Twenty five male volunteers with ages ranged between 18 and 40 years (group mean age ± S.D., 20.88±1.92 years) participated in this study. Their experience of the yoga techniques was group mean ± S.D., 14.29±10.11 months. Each participant was assessed Pre, during, and post for right nostril breathing (RNB*)* and breath awareness (BAW). The sequence of practice was changed after every alternate participants. Each session lasted for 38 minutes which was divided into 5 min pre state, 15 min during state with 1 min rest after every 5 minute of practice followed by 15 minute post state. An open circuit oxygen consumption analyzer (Quark

CPET, COSMED, Italy) was used to record the following variables i.e., respiratory rate, volume of oxygen uptake, volume of carbon dioxide produced, tidal volume, ventilation, energy expenditure per min and energy expenditure per hour. Repeated measures analyses of variance (ANOVA) followed by *post-hoc* analyses with Bonferroni adjustment were done to compare data recorded during and after the two practices with data recorded before the two practices, using PASW Version 18.0.

Results : In right nostril breathing (During, and Post) there was significant decrease in volume of oxygen uptake, volume of carbon dioxide produced and energy expenditure ($P<0.001$) breath awareness there was a significant decrease in volume of oxygen uptake, volume of carbon dioxide produced and energy expenditure ($P<0.01$).

Conclusion : The result of the present study is contrary to previous results. The difference may be due to the fact that is the first study with continuous recording using an open circuit apparatus.

Abs.CA.20

Effect of Four Weeks Yoga Exercise on Flexibility and Heart Rate

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Objective : (1) To study the effect of 4 weeks regular yoga exercise on flexibility of skeletal muscles. (2) To study the effect of 4 weeks regular yoga exercise on the basal heart rate.

Method : 25 normal subjects of age group 23±1.78 were trained 4 weeks of regular yoga training for 10 minutes at morning. The flexibility and heart rate was measured before the start of yoga training under normal condition. The training included 5 kinds of yoga exercise: Paschimothan Asana (The Forward Bend), Bhujanga Asana (The Cobra), Surya Namaskar, Utthan Pada Asana (Leg Lifting Posture), Matsya Asana (The Fish Posture).

Results : The flexibility and heart rate was measured before the training period and then after 4 weeks the change was measured. The result revealed that there was drastic change in the flexibility but the effect on heart rate was not conspicuous.

Conclusion : From the study we can conclude that the yoga exercise has good effect on the flexibility but the cardiovascular adjustments takes time. Earlier experiments proved that the regular yoga exercise decreases the heart rate but in our study 10 minutes of exercise for 4 weeks did not have remarkable change in heart rate.

Abs.CA.21

Improvement of Redox Status Through Yoga

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Objective : It is now well established that

oxidative stress is a major risk factor for the development of several metabolic and degenerative disorders as well as implemented in aging process. The modern lifestyle is known to produce various physical and psychological stresses and make the individuals prone to oxidative stress as well. The aim of this study was to evaluate the effect of yogic practices on peripheral oxygen saturation and the oxidative stress.

Method : The study was conducted on healthy male volunteers of two groups viz. yoga (n = 34) and control group (n = 08). In addition to their routine activities, the yoga group practiced yogasana, pranayama and meditation for 3months and control group did not practice the same. Blood samples were collected in fasting condition before and after 3 months of yogic practice. Reduced and oxidized glutathione, malondialdehyde, total antioxidant status, glutathione peroxidase, catalase and peripheral arterial oxygen saturation were estimated.

Results : Reduced glutathione and total antioxidant status increased significantly ($P<0.001$) where as glutathione peroxidase activity ($P < 0.001$), plasma concentration level of malondialdehyde ($P<0.01$) and oxidized glutathione ($P<0.01$) decrease significantly in yoga group after completion of 3 months of yogic practice. Peripheral arterial oxygen saturation also increased in yoga group. No significant change in any variable was noted in control group.

Conclusion : Regular yogic practice helps in improving antioxidant and redox status of yoga practitioners.

Abs.CA.22

A Comparative Study of Antioxidant Status in Yoga and Normal Adult Males

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Objective : The practice of Yoga reduces psychological stress and improves antioxidant level. It also decreases sympathetic activity and oxidative stress. Reactive oxygen species are known to aggravate disease progression. To counteract their harmful effects, the body produces various antioxidant enzymes, viz, superoxide dismutase, glutathione peroxidase etc. However, reports are scanty regarding whether yoga training can improve the antioxidant level. Hence this study is designed to appraise the role of yoga in maintaining antioxidant status.

Method : The study was conducted on fifty healthy adult males who were divided into two groups-a yoga(n=25)group and a control (n=25) group. The yoga group was trained in yoga for 6 months. The yoga schedule consisted of prayers, asanas, pranayama and meditation. The control group was not involved in any type of physical exercise. Blood samples were collected in fasting condition of both groups. Superoxide dismutase activity and glutathione peroxidase level were estimated spectrophotometrically.

Results : There was statistically significant increase in level of superoxide dismutase and glutathione peroxidasei in yoga group as compared to control group.

Conclusion : Regular practice of yoga improves the antioxidant levels of the body. Yoga has therapeutic, preventive and protective effects on many diseases by decreasing oxidative stress. The clinical relevance is that yoga practice can be used to maintain the antioxidant defense system under stressful conditions.

Abs.CA.23

Effect of Meditation on Some Physiological Variables & Psychological Wellbeing

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Objective : To provide descriptive overview of benefits of meditation for maintaining good health & psychological well being.

Method : Systematic review of the literature. Comprehensive searches were conducted in 19 electronic bibliography databases through october 2011. Other sources of potentially relevant studies included hand searches, contacting experts & literature searches.

Results : Some clinical trials on meditation were included in the review. Physiological evidence for activation of parasympathetic nervous system resulting in decrease respiratory rate, heart rate, galvanic skin response, pupil diameter & a subjective feeling of coolness at the center of palms & anterior frontanelle region has been documented by relevant sahaj yoga research publications. Some researchers also found evidence of decreased cortisol levels in regular meditators. Beta endorphins level associated with a feeling of well being are also found elevated in meditators.

Conclusion : Meditation has positive effect on psychological well being & it also alleviate stress in day to day life. Clinical trials are ongoing for benefits in various diseases & some studies got positive results. Meditation has many health benefits.

Abs.CA.24

Effect of Right Nostril Yoga Breathing and Breath Awareness on Autonomic Variables

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Objective : The aim of the present study was to assess the effect of right nostril yoga breathing and breath awareness on autonomic variables.

Method : In this study, autonomic variables were studied in 25 healthy male volunteers with ages between 18 and 45 years and their minimum experience in the yoga breathing practice was 3 months. Participants were assessed in two sessions on two consecutive days. Assessment included blood pressure, respiration rate and heart rate variability using BIOPAC MP-150 (BIOPAC, U.S.A.). On one day the session involved practicing right nostril yoga breathing (RNYB) session for 15 min, preceded and followed by 5 min of quiet sitting. During the breath awareness (BAW) session, participants were asked to be aware to their breath for 15 min, again preceded and followed by 5 min of quiet sitting. There

was 1 min. rest after every 5 min during both the sessions. The sequence of practice was changed for every alternate participant. Repeated measures ANOVA with Boniferroni adjustment were used to compare the post and during data with pre data using PASW, version 18.0.

Results : During the practice of right nostril yoga breathing, there was a significant (P<.05) increase in respiration rate (8.873%). While in the session of breath awareness, increase in the respiration rate was 10.474%, which was statistically significant (P<0.01). There was also a significant decrease in systole (P<0.05), diastole (P<0.05), and mean blood pressure (P<0.01), when during BAW was compared with pre BAW.

Conclusion : RNYB increases respiration rate without any change in heart rate variability.

Abs.CA.25

Comparative Study of Effect of Anuloma-viloma (Pranayam) and Yogic Asanas in Premenstrual Syndrome

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Objective : The present study was planned to investigate the effects of Anuloma-viloma and specific yogic asanas in Premenstrual syndrome (PMS).

Method : On the basis of a premenstrual distress questionnaire, 60 females suffering from PMS, having regular menstrual cycles from 28-34 days, between the age group of 18–40 years were selected from the students and staff members of Swami Vivekananda Subharti University campus. The subjects were divided into 3 groups-group A (Anuloma-viloma), group B (yogic asanas) and group C (no intervention). A baseline record of the systolic blood pressure (SBP; mmHg) and diastolic blood pressure (DBP; mmHg) from the right arm taken using an automated sphygmomanometer (Panasonic Omron). The heart rate (HR/min), electromyogram (EMG; mV), galvanic skin response (GSR;kΩ), respiratory rate (RR/min), peripheral temperature (T; °F), were recorded simultaneously, on an automated biofeedback apparatus Relax 701. The subjects were instructed to come to the yoga lab daily, empty stomach at 9 am to do the yogic exercises under the guidance of a trained yoga instructor, according to the group assigned to them, regularly for 7 days prior to the onset of menstruation for 3 consecutive menstrual cycles. The parameters were then recorded again at the end of 7 days in each menstrual cycle.

Results : In the group A and group B, we can see that post relaxation, in the 3rd menstrual cycle, HR, SBP, DBP, EMG, GSR and RR showed a very significant reduction (P<0.001) and T rose more significantly (P<0.001), when compared with their basal levels. On comparing groups A, B and C, post-relaxation, we saw a very significant difference (P<0.001) between the groups.

Conclusion : In the present study the relaxation response in the females suffering from PMS showed a reduction in an abnormally high basal sympathetic activity and a heightened Relaxation response in both the study groups (group A and Group B).

Abs.CA.26

Reduction in Systemic Inflammation in Response to Behavioral Therapy

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Objective : To test the immune reversal hypothesis in relation to effect of behavioral therapy on systemic inflammation.

Method : We conducted trail on 20 patients with long standing type 2 Diabetes. All volunteers attended a 4 day residential camp to receive training in the newly designed exercises, games and activities. Pre and post camp fasting blood samples were collected and tested for total WBC, CRP, granulocytes.

Results : Inflammation reduction : A decreasing trend in mean CRP levels, total WBC count, total granulocyte count and total lymphocyte counts. Monocyte count was quickest to respond but revert equally quickly. A significant positive correlation between WBC counts and CRP. A significant decrease in HbA1c in one month, average reduction of 0.5. Compliance with aggressive games negatively correlated with change in inflammatory markers.

Conclusion : Behavioral intervention to increase physical aggression and agility seems to be efficient in reducing systemic inflammation. All the advocated excises were lighter and the increment in total calorie expenditure during the camp was negative. Increment in the energy expenditure was not negatively correlated to reduction in inflammatory markers. Therefore the results are not explained by the quantum of physical excises or total energy expenditure. The type of activity appears to be more important than total physical activity.

Abs.CA.27

A Study of Pulmonary Function Tests in Hypertensive Patients Practicing Sahaja Yoga

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Objective : To study the effect of Sahaja Yoga meditation on Pulmonary Functions in Hypertensive patients.

1. To evaluate pulmonary function tests in Hypertensive patients practicing Sahaja Yoga.
2. To evaluate pulmonary function tests in Hypertensive patients not practicing Sahaja Yoga.
3. To compare pulmonary Functions of both the groups.

Method : The study group consisted of 50 Hypertensive males and females above 40 years having h/o Hypertension and taking medication since 1 year. Out of which 25 were practicing Sahaja yoga meditation daily for 10 min twice a day for more than 6 months and another 25 did not practice any type of meditation. Blood pressure was measured using Sphygmomanometer and Pulmonary function tests were done using a computerized

spirometer (Helios). Statistical analysis was done using student t test

Results : There was no significant difference in Age between the two groups .The Blood pressure values were lower in the group practicing Sahaja yoga than another group. Forced vital capacity and Forced expiratory volume in 1 sec were higher in patients practicing Sahaja yoga meditation than the another group, which was statistically significant.

Conclusion : Sahaja Yoga meditation improves the forced vital capacity and Forced expiratory volume in Hypertensive patients and also shows significant fall in Blood pressure. So Hypertensives can practice Sahaja yoga meditation for early reduction in Blood pressure and maintenance of Pulmonary Functions.

Abs.CA.28

Effect of Yoga Versus No-intervention on Different Aspects of Mental Health

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Objective : The objective of this study was to measure state anxiety, somatization of stress, quality of life, self-rated quality of sleep, and discomfort due to over-breathing which occurs when stressed.

Method : Out of a total of 140 participants, seventy participants self-selected to be in a yoga group for stress relief (group mean age ± SD, 33.0±6.5 years; 37 males). Seventy age and gender matched participants were in a control group. State anxiety, somatization of stress, quality of life, discomfort and self-rated quality of sleep were assessed using the State-Trait Anxiety Inventory, Symptom Checklist-90-R, SF-12, Nijmegen Discomfort Evaluation Scale and a Sleep Rating Questionnaire respectively. Assessments were made at the beginning and end of the week. The yoga program consisted of two sessions each day for a week. In each session participants practiced voluntarily regulated yoga breathing, loosening exercises and yoga postures. The control group participants were performing their routine activities.

Results : Repeated measures ANOVAs with Bonferroni adjusted *post-hoc* analyses showed a significant decrease in state anxiety ($P<0.001$), somatization of stress ($P<0.01$), improved health-related quality of life ($P<0.01$), self-rated quality of sleep ($P<0.01$), and decrease in discomfort due to over-breathing ($P<0.001$). No changes (except decreased discomfort due to over-breathing; $P<0.01$) occurred in the control group.

Conclusion : This study suggests that a brief yoga program may be beneficial in decreasing anxiety, somatization of stress and discomfort, improving health-related quality of life and self-rated sleep quality.

Abs.CA.29

A Study of Raj Yoga Meditation on Quality of Life of Patients with Fibroadenosis

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Objectives : To find out the efficacy of Raj yoga Meditation in fibroadenosis cases (a benign breast disease).

Method : Present study is a hospital based interventional, single blind,randomized, conducted in Dept.of Physiology, JNMC in co-ordination with Dept. of Surgery, JNMC, Wardha. Total 25 patients were from A.V. B.R.H, Sawangi & Civil Hospital,Wardha. The duration of study was 6 months. The patients were randomised to 1 of 2 treatment arms :– (i) Arm1(study group)-Patients received usual medical care & instruction on stress reduction using Raj yoga meditation which involves a standard 4 step course. (ii) Arm2(control group)-Patient received usual medical treatment only. All participants completed pre & post testing assessments immediately before & after yoga programme respectively.

Result : There was no significant change in Pulse Rate, Systolic, & Diastolic Blood Pressure. QOL Domain 1 showed a improvement from 57.46 to 74.15, QOL-2 increased from 55.0 to 74.15, QOL-3 from 68.07 to 72.23 & QOL-4 also showed a increase from 49.92 to 62.15. All the QOL Domain scores were statistically significant.

Conclusion : Our study shows that Rajyoga Meditation significantly improves QOL in patients of fibroadenosis.

Abs.CA.30

Immediate Effects of *Kapalabhati* and Breath Awareness on the Degree of Geometrical Illusion Perceived

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Objective : The long period effects of combined yogic practices on the degree of geometrical illusion perceived was studied earlier, hence the present study emphasized on immediate short period effects of single yogic breathing techniques.

Method : The study design was self as control. Random number table sampled thirty healthy males between 25 and 40 years (26.9±5.7 years) in the yoga group, recruitment based on minimum 60 per minute breath cycle in kapalabhati practices. To test the non-yoga intervention, fifteen non-yoga healthy males of comparable age was assessed on a separate day. The Müller-Lyer apparatus measured the degree of optical illusion that consisted of two trials i.e., In Trial and Out Trial. All signed the informed consent. Both the groups were intervened for eighteen minutes. In a suitable yoga posture, kapalabhati practice involved forceful exhalation while breath awareness was attention towards breath. The control session was free flow of random thoughts without modifying it. RMANOVA for yoga group and paired t-test for control group analyzed with SPSS 18.0 versions. The Ethics committee approved the study.

Results : The degree of illusion following kapalabhati decreased by (15.68 %) for ‘Out Trials’ ($P<0.001$), following breath awareness decreased by (11.13%) for ‘In Trials’ ($P<0.001$), following control session increased for both trials by (1.32%) for ‘In Trials’ ($P>0.05$) and (1.76%) for ‘Out Trials’ ($P>0.05$)

Conclusion : The results suggest that a high frequency yoga breathing (Kapalbhati) may improve certain aspects of visual perception.

Abs.CA.31

Effect of Listening to Indian Classical Instrumental Music on Neurocognitive Functions

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Objective : The study was conducted to evaluate the effects of listening to Indian classical instrumental music on neurocognitive functions in female medical students.

Method : A total of sixty volunteer medical students in the age group of 18-23yrs, were selected and divided randomly into two groups (music and non music group) of 30 students each. Music group were allowed to listen to a pre-recorded Indian classical instrumental music for 20 minutes 5 days a week. Letter cancellation test (LCT), Letter cancellation test - omission (LCT- O), Letter cancellation test - comission (LCT- C), Trail making test-A (TMT-A), Trail making test-B (TMT-B), Forward digit span (FDS) and Reverse digit span (RDS) were performed in both the groups at 0, 6. 12 and 24 weeks of the study period.

Results : There was a significant improvement in time taken to complete the Letter cancellation test (P<0.001). On comparison of two groups at different time intervals, LCT-O showed a significant improvement at 12 weeks and 24 weeks (P<0.05). TMT-A, TMT-B, FDS and RDS showed a significant decrease (P<0.001) in music group.

Conclusion : The study revealed a significant enhancement in attention, verbal memory, working memory and spatiotemporal abilities in the group who listened to Indian classical instrumental music regularly. Thus it can be concluded that listening to music has beneficial effects on neurocognitive functions.

Abs.CA.32

Effect of Yoga on Self-Esteem and Cognitive Functions in School Children

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Objective : The aim of this study was to assess the level of self-esteem and changes in cognitive functions of school children.

Method : In this study, ninety-four naïve to yoga students, with age ranges between nine and twelve years were randomly assigned to a yoga group and a physical exercise group using a random number table. In the yoga group, there were forty-seven participants (33 male and 14 female) of both sexes (group mean±S.D., 10.5±1.2 years) and also in the physical exercise group, there were forty-seven participants (24 male and 23 female) of both sexes (group mean±S.D., 10.6±1.3 years). All of them were normal healthy school children in a school in the north of India. The Indian Adaptation of Battle's self-esteem Inventory for Children was used to

assess the level of self-esteem. For the measurement of cognitive functions, Stroop color and word test was used. Assessments were done pre and post three months of intervention. The yoga group practiced yoga for 45 minutes for five days in a week for 3 months while the physical exercise group practiced physical exercise for the same duration on the same days. Statistical analysis was done using PASW (SPSS 18.0 Version).

Results : There was significant increase in the total self-esteem of the yoga group ($P<0.001$), and physical training group ($P<0.01$) when the post data were compared with pre. General self-esteem ($P<0.001$) and parental self-esteem ($P<0.05$) significantly increased after yoga. In the physical exercise group, there was significant difference in word T score ($P<0.001$), and color T score ($P<0.001$) of the Stroop task after physical exercise. There was no significant change in the Stroop task after yoga.

Conclusion : Yoga and physical exercise increases the level of self-esteem in school children.

Abs.CA.33

Effect of Yoga on Anxiety Score and Autonomic Functions in Young Healthy Students

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Objective : To study the effects of yoga practices on anxiety score and autonomic functions in young healthy students.

Method : Study was conducted in 141 student volunteers in the age group of 18-20 years. They were divided into study group and control group. Study group consisted of 74 students (36 male &38females) and control group consisted of 67 students (35males &32 females). Study group performed yoga for one hour per day for 7 days for 12 weeks. Control group did not perform any yoga practices. Taylor's manifest anxiety scale was used for assessment of anxiety status and autonomic functions were assessed by heart rate response to Valsalva manoeuvre, change in diastolic blood pressure to sustained handgrip and change in systolic blood pressure from supine to standing position.The data was analysed statistically by using paired t test.

Results : After yoga practices in study group anxiety scores were found to be reduced while autonomic function tests showed improvement in parasympathetic dominance. Sympathetic activity was found to be reduced after yoga practices.

Conclusion : Even a short term training of yoga has shown to be effective in reducing anxiety and sympathetic activity & improvement in parasympathetic activity in student population. So, yoga practices can be recommended to students of professional courses to tackle their mental stresses.

Abs.CA.34

Efficacy of a Short-Term Yoga-Based Lifestyle Intervention on Reducing the Risk for Type 2 Diabetes Mellitus

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Objectives : Obesity, erratic lifestyle, and reduced physical activity are known risk factors for type 2 diabetes mellitus (T2DM). A lifestyle intervention aiming at weight loss and increased physical activity may be beneficial in reducing the risk towards T2DM by improving impaired glucose tolerance and insulin resistance. Therefore, this study was planned to assess the effect of a short-term yoga-based lifestyle intervention on risk reduction for T2DM.

Methods : The present study included 104 subjects who underwent a 10 day yoga-based lifestyle intervention at Integral Health Clinic (IHC), Department of Physiology, AIIMS, New Delhi, which is an outpatient facility offering a yoga-based lifestyle intervention program for prevention and management of chronic diseases. The study assessments included weight, BMI, serum lipid profile, and fasting blood glucose pre and post-intervention.

Results : The mean age of the subjects was 39.53±12.82 years, and there were 55 males and 49 females. Of these, 85 subjects were overweight/obese. There was a significant reduction in body weight from Baseline to Day 10 (67.99±9.36 and 67.27±9.26 kg, $P<0.001$, respectively) and BMI (26.05±3.94 and 25.74±3.91 kg/m^2, $P<0.001$, respectively). There was a significant reduction in fasting blood glucose from Baseline to Day 10 (105.41±17.78 and 101.98±14.81 mg/dL, $P=0.005$, respectively) and triglycerides (146.60±78.56 and 133.65±70.15 mg/dL, $P=0.040$, respectively).

Conclusion : These findings suggest that a short-term yoga-based lifestyle intervention was efficacious in reducing fasting blood glucose levels, which was attained by significant weight loss. Such a benefit may contribute towards reduction in risk for type 2 diabetes mellitus.

Abs.CA.35

Effect of Yoga on NIDDM Patients

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Objective : To correlate the effect of yogic regime on biochemical parameters of NIDDM patients.

Method : n=40, type 2 diabetes mellitus both male and female within the age group of 40-60 yrs were included in the study. The diagnosis of NIDDM were done according to WHO criteria. Subjects suffering from cardiac, renal, retinal complication were excluded. Out of them 20 were advised to do asanas and pranayam along with proper diet and dose of oral hypoglycemic agents. A comparative study was done between 20 patients with only diet and drugs, 20 patients with yogic regime along with diet and drugs therapy. 30 minutes yoga consisting of asanas and pranayam were advised daily for 90 days. Asanas include two round surya namaskkar [4 mins], pawanmuktasanas [4 mins], vajrasana [2 mins], followded by pranayam (abdominal breathing, bhramari, anulom vilom) for 15 minutes, finally 5 minutes relaxation by savasana. Biochemical parameters FBS, 2 hr

PPBS, HbA1C, LIPID PROFILE were studied in patients just before starting yoga and 90 days after yoga therapy. Along with it weight, BP, BMI were measureased every 1 month interval.

Results : There is significant reduction in FBS, 2 hr PPBS, HbA1C, LIPID PROFILE in patients with yogic regime. They have also reduction in both systolic and diastolic BP. After 1 month patients with yogic regime have reduction in dose of oral hypoglycemic agents. Above all there is a sense of well being and they want to continue yoga to maintain a healthy life.

Conclusion : According to WHO all over the world at least 171 million people are diabetic. Among the developing country highest prevelance is in China followed by India, where the number of diabetic will rise from 19 million to 75 million making India diabetic capital of world.The Indian system of yoga is a holistic approach, which provides a longterm and sustainable solution to many human ailements by removing "Doshas" in our physical body. It can be used as an adjunctive therapy in case of diabetes not only by controlling blood sugar but also preventing comorbid condition like hypertension, dyslipidemia.

Abs.CA.36

Effect of Yoga on Diabetes Mellitus : A Therapeutic Approach

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Objective : Diabetes is a devastating medical condition. It is multifactorial, dependent on environmental factors as well, like obesity, sedentary lifestyle and negative nutritional issues. Considerable evidence exists for the importance of yoga as an adjuvant therapy for various conditions. This case study attempts to focus on the scientific basis of some Yogic practices such as Asanas, pranayama and meditation as complementary intervention. The study was aimed to observe the impact of selective yogic practice as curative and prophylactic measures to counter the metabolic disorder.

Method : With this background of Diabetes and the existing management, two cases of diabetes were treated with yogic practices with good results. The interventions consisted of asanas, pranayama, relaxation techniques, individual counseling, advice on philosophy of yoga, importance of yoga in daily life, meditation, stress management, nutrition and background knowledge about the illness.

Result : After intervening the yoga counseling and practical yoga sessions for 30-45 days, there was considerable symptomatic improvement in; improved appetite, low back pain, stiffness, limitation of movement, pain in calves, swelling in forearm was found effective from the patient's feedback.

Conclusion : These observations suggested that a short term yogic awareness programme for lifestyle modification by giving 30–45 days practical yoga sessions could lead to holistic symptomatic relief and beneficial effects starts appearing during initial

period of practice. This isolated case report warrants a need for controlled clinical trial of ardhamatsyendrasana, Bhujangasana, dhanurasana and other yogic practices to establish their role in the management of diabetes.

Abs.CA.37

Effect of 12 Week Yoga Therapy as a Lifestyle Intervention in Patients of Type 2 Diabetes Mellitus with Distal Symmetric Polyneuropathy

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Objective : To study the effect of addition of 12 week yoga therapy to standard medical care in patients of type 2 diabetes mellitus (DM) with distal symmetric polyneuropathy (DSP) on anthropometric parameters, indices of glycemic control, clinical outcome and nerve conduction studies.

Method : Patients of type 2 DM with symptoms/signs of DSP were randomized to either control group (n=22, age=52.4±9.1 yr) or yoga group (n=25, age=52.2±9.3). Control group received standard medical care in the form of individualized drug therapy and advice on diet and exercise (brisk walking for 30 minutes/day). Yoga group received 12 week supervised yoga therapy sessions in addition to the standard medical care. Anthropometric parameters, biochemical parameters (fasting glucose, glycated hemoglobin), clinical profile (diabetic neuropathy symptom score, diabetic neuropathy examination score, and visual analogue score for pain), resting blood pressure (BP), heart rate, motor conduction studies of median, ulnar, tibial and peroneal nerves, sensory conduction studies of median, ulnar and sural nerves, were assessed at baseline and after a follow-up period of 12 weeks. P values < 0.05 were considered statistically significant.

Results : In the yoga group, waist circumference decreased significantly, and there were significant improvements with respect to symptom, examination and pain scores, mean arterial pressure, tibial distal motor latency, and median and ulnar sensory nerve action potential amplitudes in comparison to control group. Fasting glucose and glycated hemoglobin deteriorated significantly in the control group.

Conclusion : Our study provides evidence that the addition of yoga therapy to standard medical care can confer additional benefits in terms of improving clinical outcome, glycemic control, resting blood pressure, and peripheral neurophysiologic derangements in patients with diabetic neuropathy (DN). Further studies are required for yoga to become a scientifically established form of complementary therapy for DN.

Abs.CA.38

Effect of Yoga in Children Suffering from Nasobronchial Allergy

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Objective : (1) To evaluate the effects Yoga on childhood nasobronchial allergy in the age group of 8-14 years. (2) Whether it would improve the quality of life of children

suffering from nasobronchial allergy.

Method : The present study was conducted on 150 children aged between 8-14 years. They were divided into three groups on the basis of their disease. Group 1 suffering from Bronchial Asthma, group 2 suffering from Allergic Rhinitis and group 3 suffering from both -Allergic Rhinitis and Bronchial Asthma. Each group of 50 patients was further sub divided into two sub groups of 25 each as per the intervention. The control sub group of 25 children in each group received only conventional therapy and other 25 children in each sub group received an intervention as yoga practices in addition to the conventional therapy. They were closely monitored continuously for yoga practices at home for 12weeks. The effectiveness of these practices was assessed by means of Asthma Quality of Life (AQOL) scores through a standard questionnaire and Spirometery in both the groups at 0 wk (baseline), 6 and 12 wks.

Results : In the yoga group, there was a steady and progressive improvement in pulmonary functions (statistically significant increase in MVV) as compared to the their baseline values. There was a significant improvement in Asthma Quality of Life (AQOL) scores in yoga groups than the other group over the 12-wks study period.

Conclusion : Improvement in the quality of life and pulmonary functions amongst children suffering from NBA practising yoga as adjunct to their conventional therapy clearly indicates positive effect of yoga in them.

Background : There is a substantial body of evidence on the efficacy of yoga in the management of bronchial asthma. Many studies have reported the positive effects of yoga on bronchial asthma, significant improvements in pulmonary functions and quality of life in adults. However, very few of these studies have investigated the effects of Yoga in Childhood allergic rhinitis and Bronchial Asthma.

Abs.CA.39

Cardiovascular Disease Risk Factors are Reduced by a Short-Term Yoga-Based Lifestyle Intervention in Overweight/Obese Male Subjects

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Objective : To assess effects of short term yoga based lifestyle intervention on markers of vascular inflammation, endothelial function and lipid profile.

Method : Male subjects (n=30) with Body Mass Index (BMI) of 26.35±2.58 kg/m^2 underwent a yoga-based lifestyle intervention for 10 days at Integral Health Clinic, dept of Physiology, AIIMS, New Delhi. Assessment was done before and after the intervention, and included weight, BMI, blood pressure, lipid profile, plasma levels of interleukin-6, adiponectin and endothelin-1.

Results : There was significant reduction in weight from Baseline to Day 10 (74.35±8.45, 72.99±8.80 kg, P<0.01, respectively) and BMI (26.35±2.58, 25.73±2.63 kg/m^2, P<0.01, respectively). Also there was a significant decrease in serum LDL-cholesterol from Baseline to Day 10 (98.38±27.70,

93.88±28.66 mg/dL, P<0.05, respectively), ratio of serum LDL-cholesterol to serum HDL-cholesterol (2.63±0.62, 2.21±0.51, P<0.05, respectively). There was a significant reduction in plasma IL-6 (P<0.05) from Baseline to Day 10. The beneficial effect of this intervention also reflected a numerical reduction in systolic blood pressure which was significantly correlated with reduction in plasma IL-6 levels. There was a significant increase in the levels of plasma adiponectin (P<0.05), which was also significantly correlated with an improvement in the lipid profile.

Conclusion : The findings suggest that a yoga-based lifestyle intervention may be efficacious in reducing vascular inflammation and improving endothelial function in obese/ overweight subjects as observed by a reduction in levels of plasma IL-6 and increase in levels of plasma adiponectin with an improved lipid profile

Abs.CA.40

Effect of Yoga on Physical and Cardio-Respiratory Parameters of Healthy Subjects

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Objective : In recent years, a lot of research studies have shown that Yoga can be useful in prevention, treatment and rehabilitation of many diseases. In many parts of the world, in recent years, Yoga has been used effectively for physical training of players and athletes too. The aim of this study is to check the effect of Yoga on healthy subjects of age group 20-50 years.

Method : This study was conducted on 30 subjects performing yoga under the guidance of a Yoga instructor. All 30 subjects performing yoga were placed in one group and they practiced yoga for 10 weeks. All the subjects were examined twice, before they started yoga practice and after 10 weeks of yoga practice. 15 subjects, age group ranging between 20 to 50 years, selected as control group, were not performing yoga. They were also examined twice at the interval of 10 weeks. Both the groups were examined for parameters like weight, chest expansion, tidal volume, breath holding time, vital capacity and blood pressure (systolic and diastolic).

Results : The result of the study showed highly significant improvement in breath holding time, blood pressure systolic and blood pressure diastolic at P value <0.001 among study group. There was significant improvement in vital capacity too at P value <0.05 among study group. Whereas, weight, chest expansion and tidal volume didn't show significant difference between two groups.

Conclusion : This study concludes that yoga has great value in improving health, especially in terms of respiratory and cardio-vascular function.

Abs.CA.41

Comparison of Electroencephalographic

Changes between "AUM" Chanting and Dynamic Meditation Before and After 15 Days of Training Among Medical Students

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Abstract : Aum is the name or symbol of God. From the original sound, Aum, all things become manifest as its extension embodiments. Dynamic meditation spread by Osho is one of the meditative techniques, which is a part of yoga.

Aims and Objectives :

1. To see the effect of "aum" chanting and dynamic meditation for 15 days on electroencephalogram of medical students.
2. To compare the electroencephalographic changes between the two methods of meditation.

Methodology : We have recorded electro-encephalogram and heart rate using 18 channel digital electroencephalographic machine. The students were divided in two groups randomly namely "group A" for 15 days of "aum" chanting and "group B" for 15 days of dynamic meditation. Electrogram recordings were taken after 5 minutes of rest before the training session of 15 days and after the training session in 20 medical students.

Results : The basal electroencephalogram pattern of all subjects showed beta waves indicating a state of high mental activity before the practicing sessions. All the group 'A' students after practicing "aum" chanting for 15 days showed high voltage alpha waves and 6 students displayed occasional theta waves in the electroencephalogram pattern reflecting a high state of mental calmness and relaxation. All the group 'B' students after practicing dynamic meditation for 15 days showed high voltage alpha waves and 5 students displayed exclusively theta waves in the electroencephalogram pattern reflecting a high state of mental calmness and relaxation. There was a reduction in the basal heart rate in all the subjects of both the groups after 15 days of practice of either "aum" or dynamic meditation.

Conclusion : Based on the results obtained in this study, it is concluded that both the types of meditation produce intense physical and mental relaxation.

Abs.CA.42

Impact of Yoga Training on Blood Coaguability State in Young Healthy Individuals

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Body of the abstract (not more than 250 words)

Objective : Yoga in India has been reputed to develop remarkable control over bodily functions and it provides one of the best means of self improvement and attaining once full potential. This study was carried out for evaluation of effect of yoga training on blood coagulation state and how it is beneficial to prevent various clinical problems.

Method : 40 normal young healthy individual aged between 20-35 years were taken as subjects, trained for various type of yoga exercises for 90 days under supervision of professional trainers. Kapalbhati, Surya-Namaskar, Anulome-Vilom and Bhastrika were some of the important yoga kriyas selected for training. Assessment of haematological parameter like Platelet count, Clotting time, Bleeding time were done before the training and after the training. Data's were statically evaluated by student t- test.

Results : The data was statically analysed using student t-test and result showed significant increase in clotting time after regular yoga training in 33 subjects out of 40. The bleeding time was found to decrease in 36 subjects (90%) and the platelet count was increased in 87% subjects.

Conclusion : Studies showed that yoga can decrease fibrinogen level as well as increase fibrinolytic activity so it can maintain the blood hypocoaguability. Impact of yoga on prevention of cardiovascular and thrmbotic disorders like congestive heart failure (CHF), Ischemic heart diseases (IHD), cerebral ischemic diseases (CID) etc. are obvious.

It can be helpful to cure bleeding disorders also as per its impact over Platelet count and Bleeding time. Yoga is a type of exercise which is more preventive than curative.

Abs.CA.43

Effect of Six Week's Yogasana Training on Hematological Parameters and Lipid Profile

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Objective : Aim of present study was to observe changes induced by yogic practices in hematological parameters, lipid profile and blood glucose among subjects undergoing a 6 week Yogic training course.

Method : Present study was done on 34 volunteer subjects [15 Males and 19 Females] attending Pattanjali Yoga training Institute at M.E.S. High school, Davangere. Subjects were in the age group of 20-60 years. Training sessions were held regularly for about 6 weeks in early morning.Hamatological parameters like Hb %, RBC, WBC, Platelets count and blood indices were determined by the help of haemogram by automotive cell counter SF-3000 and for haemogram study 2 ml of blood was in EDTA vial after aseptic precautions. Fasting blood glucose and lipid profile were assessed by ELISA Kit. All the above parameters were initially and after completion of 6 week yoga training programme. Statatistical analysis was done using paired "t" test to compare the effect of yogasana before and after the training.

Results : After 6 weeks of yoga training there was significant increase in Hb%, MCH, MCHC and Neutrophil count. Though RBC count was increased it was not statistically significant. There was decrease in leukocytes count and differential count showed decrease in lymphocyte, Eosinophil, Monocytes and Basophils but it was statistically insignificant. There was significant decrease in serum triglycerides, VLDL, LDL/HDL ratio, TC/HDL

ratio, S.C/HDL ratio after yogic training. Fasting glucose, serum cholesterol, low density lipoproteins were also decreased after training.

Conclusion : Present Study reveals that yogic asanas minimizes all types of stress indicating anti-stress and anti-oxidant effect as revealed by decreased leukocyte count, increased RBC and Hb% and improvement of biochemical profiles like HDL, LDL, Serum Triglycerides and Fasting glucose.

Abs.CA.44

Influence of One Week Integrated Approach of Yoga Therapy on Quality of Living and Memory in Patients with Type II Diabetes Mellitus

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Objective : To investigate the influence of integrated approach of yoga on :

1. The quality of living of diabetics by using Quality of Life Instrument for Indian Diabetes Patients (Qolid) and
2. Memory status of diabetics using Wechsler's memory scale

Method : Study included all diabetics coming to SVYASA AROGYADHAMA for yoga therapy from 8th July to 30th July 2011 and volunteering to participate in the study after taking informed consent. All diabetics were assessed on the first day and again after one week of yoga practice at Arogyadhama with Quality Of Life Instrument For Indian Diabetes Patients (Qolid) And Wechsler Memory Scale. Ethical clearance has been obtained.

Results : The quality of living of diabetics significantly improved after yoga intervention with mean±SD (77.40±7.17) as compared to before yoga intervention (72.54±7.27) with P value is 0.000 and the memory status of diabetics is also significantly improved after yoga intervention with mean±SD (21.25±6.69) as compared to before yoga intervention (18.29±.79) with P value is 0.000.

Conclusion : Integrated yoga practices can improve quality of living and memory status of diabetics within one week.

Abs.CA.45

Efficacy of Short Term Yoga Therapy Program on Quality of Life in Patients with Psychosomatic Ailments

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Objective : To study the effect of short term yoga therapy program on quality of life in patients suffering from psychosomatic ailments.

Methods : Sample size and Study period : All the subjects coming to SVYASA AROGYADHAMA for yoga therapy for various ailments from 8th July to 30th July 2011 and volunteering to participate were enrolled in the study after taking informed consent.

Inclusion criteria :

1. All subjects who were diagnosed for psychosomatic ailments based on history and previous investigations and more than 18 years of age.
2. All subjects who understood English.

Exclusion criteria:

1. Subjects from psychiatry section.
2. Subjects who came for rehabilitation.
3. Subjects who were severely ill, with complications and uncontrolled disease.

All 94 subjects who were enrolled in the study underwent Integrated Approach to Yoga Therapy which included Asanas, Pranayamas, meditation, Kriyas and lectures on practice of yoga and derived special techniques in their respective sections. The quality of life was assessed by SF 12 questionnaire and calculating physical and mental composite scores before and after 1 week of yoga therapy. Data thus obtained was analyzed using paired t test.

Results : A significant improvement was seen in the study group in both physical composite score from mean ± SD of 37.50±9.58 to 43.7±8.73 and mental composite score from 45.87±9.57 to 53.35±7.9.

Conclusion : A short term yoga therapy program leads to remarkable improvement in the quality of life of the subjects and can contribute remarkably in management of psychosomatic disorders.

Abs.CA.46

A Follow Up Study with Back Pain Patients

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Objective : The aim of the present study was to assess the level of pain and quality of life among back pain patients after two months from starting a yoga intervention.

Method : In this study, sixty participants with age ranges between 20 and 45 years were randomly assigned to yoga and control group using a random number table. In the yoga group, there were 30 participants (14 males and 16 females) of both sexes (group mean± S.D., 37.3±7.3 years) and also in the control group, there were 30 participants (18 males and 12 females) of both sexes (group mean ± S.D., 36.1±5.4 years). Participants of both groups were staying near a residential yoga center located in north India. Physical (HRV, abdominal respiration rate, flexibility of spine) and psychological assessments (level of anxiety, back pain and stress level using analog scale) along with MRI testing was done. Participants of yoga group practiced *asanas* and *pranayamas* in the morning time 08:00–09:00 hours, thrice in a week. For the rest of the week, they were practicing yoga at their home. For the control group, some educational sessions were provided. All of

them were lower back pain participants. At the 60th days patients were followed up by telephone calls, with the questions related to their back and leg pain, daily activities, stiffness in back, medication and the status of yoga practice.

Results : In the yoga group, 66.7% of them rated their pain below 50% in the lower back, 33.3% did not felt the pain radiation into the leg, 36.7% of did not felt their work affected due to pain, 46.67% were not feeling stiffness in their back, 83.33% were not taking any medicine and 86.67% were practicing yoga. While in the control group, 46.7% rated their pain below 50% in the lower back, 36.7% did not felt the pain radiation into the leg, 13.3% of did not felt their work affected due to pain, 13.3% were not feeling stiffness in their back, and 70.0% were not taking any medicine.

Conclusion : The quality of life of the back pain patients is affected by the complications of back pain.

Abs.CA.47

Personality Analysis by *Chakra* Method and Its Relation with Food Habits in Medical Students

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Objective : To analyze different personality types by chakra method and find statistically significant association between personality type and diet in undergraduate medical students in the age group 18-25 years.

Method : The study was conducted on 353 medical undergraduates between 18 and 25 years, out of which 126 were males and 227 females. Ethical clearance and informed consent were taken. This study targets young population with the intention of increasing their awareness regarding correct food habits, which is closely associated with betterment of personality. Questionnaires were used to assess the personality type and diet pattern. Personality was grouped as Satvik, Rajasik and Tamasik. A scoring system for diet, classified diet as high score Satvik, medium score Rajasik and low score Tamasik types. Chakra questionnaire tested values, behaviour, orientation and choice which determine the personality. Diet questionnaire tested eating habits, food preference and awareness about healthy food.

Results :

1) In both males and females, those having Satvik personality had high scores, Rajasik had medium to low diet scores, while Tamasik had low diet score.

2) Applying Pearson's Chi-square test, there was a statistically significant association between personality type and diet, with P value less than 0.001 at 5% level.

Conclusion : There was a significant association between diet scores and personality type of the individuals studied. Satvik personality had superior eating habits, food preference and awareness about healthy food and so scored high in diet questionnaire as compared to Rajasik and Tamasik personalities, who scored in the medium and low range respectively.

Abs.CA.48

Influence of Short Term Yoga Retreat on Anxiety Levels and Stress Levels in Patients Suffering from Psychosomatic Disorders

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Objective : To study the effect of short term yoga therapy on anxiety levels and stress levels in patients suffering from psychosomatic disorders.

Method : Sample size and Study period: All the subjects, more than 18 years of age and who understood english coming to SVYASA AROGYADHAMA for yoga therapy for various ailments from 8th July to 30th July 2011 and volunteering to participate were enrolled in the study after taking informed consent. Subjects from psychiatry section, who came for rehabilitation and who were severely ill, with complications and uncontrolled disease were excluded from this study. 94 subjects were enrolled in this study .all of them underwent Integrated Approach to Yoga Therapy which included Asanas, Pranayamas, meditation, Kriyas and lectures on practice of yoga and derived special techniques in their respective sections. The anxiety and stress levels were assessed by Spielbergers state trait anxiety inventory (STAI) and Perceived stress scale (PSS) respectively, before and after 1 week of yoga therapy. Data thus obtained was analyzed using paired t test.

Results : A significant decrease in anxiety scores with mean and SD (41.5±9.90 to 33.7±9.12) and stress levels (17.5±6.12 to 12.19±5.3) was seen in the study group.

Conclusion : A short term yoga therapy program leads to remarkable decrease in anxiety and stress level and hence can be a helping hand in improving the mental wellbeing of patients with psychosomatic disorders.

Abs.CA.49

Effect of *Sudarshan Kriya* and Related Practices (SK&P) on Cardiovascular and Mental Health in Normal Healthy Volunteers

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Objective : To study the efficacy of 3 month regular SK&P for 1/2hr daily on cardiovascular &mental health of347 normal healthy volunteers and its differential effects on basis of age and gender.

Method : 347 volunteers who were divided in groups according to

- Age – Group 1 – Age ≤ 31years and Group 2 or – Age > 31 yrs) and;
- Gender

They learnt SK&P in Art of Living centers under trained specialists & practiced them for 1/2 hour daily 6 days a week for 3 months. Their following assessment of health status

was done before and after intervention

1. Cardiovascular-systolic and diastolic blood pressure recorded with a sphygmomanometer.
2. Mental health-Hamilton anxiety and Hamilton depression scale and GHQ 28 and evaluated for statistical significance

Results : Diastolic BP reduced from 85.20± 8.889 to 84.77±8.661 P<0.0001; systolic BP from 127.00±7.708 to 126.38±7.024 P<0.001 showing a significant improvement in cardiovascular health status. Moreover, improvement in mental health was observed by decrease in Hamilton depression and Hamilton anxiety score from 7.50±4.330 to 6.30±3.541 (P<0.0001) and 7.37±4.134 to 5.40±3.345 (P<0.0001) respectively. Also, GHQ 28 scores decreased from 3.02±1.906 to 2.32±1.472 (P<0.0001). Mental health improvement was consistent to all age groups and gender. Age group showed a statistically greater improvement in diastolic BP Hamilton depression and GHQ28 Females showed no significant decrease in systolic BP though significantly greater decline for Hamilton depression score compared to males.

Conclusion : SK&P can alleviate anxiety, depression and improve mental and cardiovascular health irrespective of age and gender though a greater response is observed in Elderly compared to the young in control of diastolic BP alleviating depression and improving general health, in Males for control of BP and females in alleviating depression.

Abs.CA.50

A Comparison on Healing Effects of an Ayurvedic Preparation and Silver Sulfadiazine on Burn Wounds in Albino Rats

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Objective : To compare Healing Effects of an Ayurvedic Preparation and Silver Sulfadiazine on burn wounds in Albino Rats.

Method : Albino rats – 30 male/female rats weighing between 150-200 gm were used in the study. They were individually housed and maintained on normal diet and water ad libitum. Partial thickness burn wounds were inflicted, on overnight-starved animals under phenobarbitone (30 mg/kg i.p.) anesthesia, by pouring hot molten wax at 80°C into a plastic cylinder of 300 mm^2 circular openings placed on the shaven back of the animal. Apart from the drugs under investigation no local/ systemic chemotherapeutic cover will be provided to animals. All the animals were assessed for the percentage of wound contraction, signs of infections, scab formation and histopathological examination.

Results : Percentage of wound healing was significantly better in the test ointment group compared to the standard. Signs of infection were observed in more animals in the test ointment group compared to the standard. Scab formation also took place earlier in the test ointment group compared to standard.

Conclusion : The burn wound healing effect of the ayurvedic ointment under study is better in comparison to standard therapy of silver sulfadiazine. The problem of infection encountered with the test ointment can be

overcome by changing the concentrations and proportions of the ingredients in the test ointment which constitutes the further plan of study.

Abs.CA.51

Yoga For Combatants

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Objective : Regular yogic practice provides the practitioner with more physical flexibility, muscle endurance, maximal work output and oxygen consumption, increased vitality, alleviated psychological stress and reduced cardiovascular risks. Several reports have been made with regard to its effects on cardiovascular, respiratory, metabolic, hormonal and neural systems. The study therefore aimed to evaluate the efficacy of different combinations of yogic practices.

Method : The studies were carried out using physical, physiological, and psychological and biochemical parameters. Designated yoga packages were implied for different forces.

Results : Study on BSF personnel showed significant increase in back leg muscle strength and maximum voluntary ventilation. Systolic and Mean blood pressure was significantly decreased as expected. Anaerobic capacity and breath hold time also observed significant increase after yogic training and breathing maneuvers. There was significant improvement in peak power of short term exercise revealing improvement in anaerobic capacity. Yoga package for High Altitude was introduced on more than 3300 Armed Forces personnel posted at high altitude are revealed subjective betterment in terms of enhanced physical and physiological profile alongwith better subjective interpersonal relations. Yoga package for Air Force Personnel was found to be effective for the improvement of physical, physiological, reduced and oxidized glutathione, glutathione peroxidase and antioxidant status. Significant improvement was also found in cognitive functions, simple & choice reaction time and working memory.

Conclusion : Yoga practices for BSF, Armed Forces and Air Force personnel were found to be effective for improving health and fitness in addition to their regular physical activities.

Abs.CA.52

Effect of *Pranayam* on Ventilatory Functions

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Objective : To study the beneficial effects of pranayama training. To assess the effects of Pranayama practice on some pulmonary functions.

Method : Sixty two healthy young first M.B.B.S students served as subjects. The pranayama practice consisted of Kapalbhat, Yogic shawsan, Bhashrika, Nadishuddhi and Bhramari for one hour per day-6days per week for two months.Lung functions were

assessed before and after pranayama practice by Medispiror machine.

Results : It was found that 1-FVC, FEV1, PEFR and MVV were significantly increased. 2-RR was significantly increased.

Conclusion : Thus the present study suggests that regular practice of Pranayama improves ventilatory functions and increase in the tolerance to CO_2 as shown by decrease in RR.

Abs.CA.53

Assessment of Cardiovascular Response to Isometric Handgrip Exercise in Yoga Practitioners

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Objective : Change in food habits and sedentary lifestyle has contributed to cardiovascular morbidity among younger generation in recent times. Yoga is a science of body culture which rejuvenates body and mind. Therefore, an attempt is made to assess the effect of Isometric Handgrip Exercise (IHE) on Heart Rate (HR), Blood Pressure (BP) and Rate Pressure Product (RPP) in yoga practitioners compared to non-yoga practitioners.

Method : Change in food habits and sedentary lifestyle has contributed to cardiovascular morbidity among younger generation in recent times. Yoga is a science of body culture which rejuvenates body and mind. Therefore, an attempt is made to assess the effect of Isometric Handgrip Exercise (IHE) on Heart Rate(HR), Blood Pressure(BP) and Rate Pressure Product (RPP) in yoga practitioners compared to non-yoga practitioners.

Results : Immediately after the exercise, the HR, SBP and the DBP increased in both the study group as well as the control group. But the increase was less in the study group when compared to controls, which was statistically significant ($P<0.005$).

Conclusion : Yogasanas are physical postures by which the physical revitalization and mental calmness can be achieved. IHG test provides pressor stimuli to cardiovascular system through efferent pathways with a resultant increase in HR and BP. Regular practice of yoga is said to cause an increase in parasympathetic activity, reducing the stress on the heart thereby improving the fitness of an individual.

Abs.CA.54

Resting Heart Rate Variability After Yogic Training and Swimming : A Prospective Randomized Comparative Trial

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Objectives : Resting heart rate variability is a measure of the modulation of autonomic nervous system at rest. Increased heart rate variability achieved by the exercise is good for the cardiovascular health. However, prospective studies with comparison of the

effects of yogic exercises and those of other endurance exercises like walking, running and swimming on resting heart rate variability are conspicuous by their absence. With this background, this study was designed to assess the effects of yogic exercises on resting heart rate variability in normal healthy young volunteers and to compare these effects in randomly selected group of sedentary volunteers who were subjected to endurance exercise namely swimming.

Methods : Eighty sedentary volunteers were randomly ascribed to either yoga or swimming group. Baseline recordings of digital electrocardiogram were done for all in the subjects in cohorts of 10. After yoga training and swimming for 12 weeks, evaluation for resting heart rate variability was done again. Percent change for each parameter with yoga and swimming was compared using unpaired t test for data with normal distribution and using Mann-Whitney U test for data without normal distribution.

Results : Most of the HRV parameters improved statistically significantly by both modalities of exercise. However, some of the HRV parameters showed statistically better improvement with yoga as compared to swimming.

Conclusion : Practicing yoga seems to be the mode of exercise with better improvement in autonomic functions as suggested by resting heart rate variability.

Abs.CA.55

Quality of Life in Asthma Patients After Yogic Exercises : A Scientific Data Report

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Objective : Asthma is a chronic disorder that can place considerable restrictions on the physical, emotional and social aspects of the lives of patients.

Method : The Asthma Quality of Life Questionnaire (AQLQ) was developed to measure the problems that adults with asthma experience in their day-to-day lives. Aim of our study is to compare AQLQ along with pulmonary functions and diffusion capacity in patients of bronchial asthma before and after yogic intervention of 2 months. The study was conducted on 60 diagnosed stable asthma patients in the age group 18-60 years of either sex in the department of physiology. Patients were taken from Guru Teg Bahadur Hospital, Delhi. Sixty stable asthmatic patients were randomized into two groups i.e. group 1 (Yoga training group) and group 2 (control group). Each group included thirty patients. Pulmonary function tests were recorded using computerized Medisoft Expair. Lung functions & AQLQ were recorded on all patients at baseline, after one month and then after two months.

Results : Group 1 subjects showed a statistically significant improvement ($P<0.01$) in Transfer factor of the lung for carbon monoxide (TLCO) forced vital capacity (FVC), forced expiratory volume in first second (FEV1), FEV1/FVC, peak expiratory flow rate (PEFR), maximum voluntary ventilation (MVV), slow vital capacity (SVC). Quality of life also improved significantly- Symptom domain from 4.56±0.43 to 6.21±0.63, activity domain from 4.38±0.91 to 6.03±0.73, emotion domain from 4.16±0.73

to 5.58±0.82, environment domain from 3.80±1.13 to 4.80±1.07.

Conclusion : It was concluded that pranayama & yoga breathing and stretching postures are used to increase respiratory stamina, relax the chest muscles, expand the lungs, raise energy levels, and calm the body.

Abs.CA.56

Effect of Yoga Nidra on Anxiety and Depressive Symptoms in Patients With Menstrual Irregularities

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Background : Emotional insecurity, stress, depressive or/and anxiety symptoms are common with variable severity among the patients with menstrual disorder. Yogic relaxation therapy (*Yoga Nidra*) leads to conscious and subconscious recognition of these underlying psychological factors and helps releasing of suppressed conflicts.

Objective : To evaluate the effect of *Yoga Nidra* on anxiety and depressive symptoms in patients with menstrual disorders.

Methods : Subjects were recruited from the Department of Obstetrics and Gynecology, C.S.M. Medical University (erstwhile KGMU), Lucknow Uttar Pradesh, India. The subjects were randomly divided in to two groups: Intervention Group (with yogic intervention) and a Control Group (without yogic intervention). Assessments of all subjects were carried out by administering Hamilton Anxiety Scale (HAM-A) and Hamilton Rating Scale for Depression (HAM-D) at baseline and after six months.

Results : Anxiety symptoms decreased significantly (P<0.003) along with depressive symptoms (P<0.02) after six months of yoga therapy (*Yoga Nidra*) in intervention group in comparison to control group.

Conclusion : The present study suggests that severity of anxiety and depressive symptoms in patients with menstrual disorders can be 7 decreased significantly by applying a program based on yogic intervention (*Yoga Nidra*).

Key Words : *Yoga Nidra*, menstrual disorders, anxiety and depressive symptoms.

Abs.CA.57

Pranayama has Additive Beneficial Effect Along With Medication in Bronchial Asthma Patients

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Objective : Bronchial asthma is a large economic burden i.e. 12.7 billion$ globally. Efficient and safe asthma control by pranayama will not only reduce the economic burden but also side effects of drugs by reduceing the doses of drugs. The aim of our work was to compare dynamic lung tests in bronchial asthma patients under treatment practicing pranayama (study group) and not practicing pranayama (Control group) and compare the changes in dynamic lung tests with duration of Pranayama.

Method : The study was conducted in the Department of Physiology at S.N.M.C. Agra with the help of computerized microlab spirometer (Model Spirolab/Spirolab – II). The study population were bronchial asthma patients of 20-45 years age group. 80 cases of bronchial asthma practicing pranayama was study population and 20 bronchial asthma patients not practicing pranayama were the control group. The cases were instructed by trained yoga instructor to perform Anuloma-viloma and kapalbharti pranayama regularly for 3 months and then dynamic lung function parameter FEV1, FVC, FEV1/FVC, PEFR was recorded before and after pranayama and observation were studied by applying student t test and evaluated statistically

Results : 1. FEV1, FVC, FEV1/FVC, PEFR is similarly improved in both study and control group, on comparing study and control group after 1 month of pranayama. 2. FEV1, FVC, FEV1/FVC, PEFR is improved in study group, not in control group, on comparing study and control group after 2 & 3 month of pranayama.

Conclusion : Pranayama has additive beneficial effect along with medication in bronchial asthma patients.

Abs.CM.01

The Role of Ion Channels in the Maintenence of Bovine Chondrocyte Resting Membrane Potential

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Objective : Studies analyzing the electro-physiological properties of the chondrocyte membrane have implicated K^+, Cl^- as well as non specific cation channels as primary contributors to the chondrocyte resting membrane potential. This study was conducted to identify the specific ionic conductances responsible for the chondrocyte resting membrane potential (RMP).

Method : Freshly isolated bovine chondrocytes, from both the metatarsophalangeal joints and metacarpophalangeal joints of legs obtained from the slaughter house were used. Patch clamp experiments were performed in the whole cell patch clamp configuration. The cell was clamped at voltages ranging from –80 mV to +70 mV in 10 mV steps. The currents across the membrane were recorded. The Resting Membrane Potential was recorded in the current clamp mode. Tetraethylammonium (TEA) 10 mM and Barium chloride 5 mM, (both known to block delayed rectifier potassium channels) as well as DIDS 100 µM (a Cl-channel blocker) were used to identify the currents recorded. The effect of TEA, DIDS and Ba++ on the RMP was also assessed.

Results : A high density of voltage gated potassium channels, was seen in bovine chondrocytes. These currents were inhibited by 10 mM TEA and completely by 5 mM Ba++. There was no effect seen with DIDS. The resting membrane potential was also depolarized by TEA and by Ba++.

Conclusion : Bovine chondrocytes show a high density of voltage gated potassium channels, the current profile of which is suggestive of delayed rectifiers. The