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Examining The Effect Of Callisthenic Exercise On Lipid Profile In Sedentary Individuals

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ABSTRACT

The purpose of the study was to develop calisthenics exercise program and study its effect on the lipid profile of sedentary individuals. For this study single group pre and posttest method was used for the study in which 40 sedentary male from Khalsa Health Club, Pune, participated and their age ranged between 18-42 years.

Samples weight and Height were measured by researcher and assistant for body mass index. Lipid Profile Test - Total Cholesterol, High Density Lipoprotein Cholesterol (HDL-C), Low Density Lipoprotein Cholesterol(LDL-C), Very Low Lipoprotein Cholesterol (VLDL-C) and Triglycerides (TD) these factors were measured in Samarth pathological laboratory, Pune. BMI measurement, samples weight and Height were measured by body scale and then calculated.BMI = wt (kg) / Height(m) ^{2}.Followed with 12 week exercise training program and every week 4 days session.Finally, when the training period of 12 week was over the post test was taken and the data collected and analyzed. After the designed intervention program was applied the post test data was collected and paired sample t-test was used to determine the effect of intervention program on lipid profile level. ANOVA was used to comparison between the four different age groups of the total population.

It was found that Total Cholesterol, LDL, Triglyceride and Non HDL decreased and HDL of sedentary subject increased after the calisthenics exercises training program and it were statically as well as numerically significant. This research has determined the effect of calisthenics exercise on lipid profile on male sedentary subjects between ages 18- 42 years old.

KeyWords: Callisthenic exercise, Sedentary and Lipid profile

INTRODUCTION

A lot of people today are living sedentary lifestyle. Sedentary life is a type of lifestyle with irregular physical activity. Individuals working in offices, students, firms, etc., are sitting down all the time and usually, they only get up when its break time, meal time and going to the comfort room. They are always sitting down the whole day while doing their work. They don't sweat much because they usually have air-conditioned workplace and therefore, there's no way that their body burns up the fats and calories they have stored. This kind of idleness affects blood circulation, it becomes slower and the flow of blood gradually decreases and when someone does not do physical activity all your muscles are no longer used, leading to poor blood circulation throughout the body, bringing along other health problems like obesity, heart disease, muscle that are atrophying, diabetes, osteoporosis and apnea during sleep. Obesity is a problem that is

closely linked to lack of exercise and excess weight will result in a sedentary lifestyle, creates the risk of serious health problems. As a result, a sedentary lifestyle is linked to a lower quality of life and an increased risk of death (Varo, J.J. et al 2003).

Lipid and lipoprotein abnormalities play a major role in the development and progression of coronary artery disease and diabetes mellitus is still the leading cause of death due to Obesity. Low-density lipoprotein cholesterol (LDL-C) levels that are abnormally high and low levels of high-density lipoprotein cholesterol (HDL-C) levels that are abnormally have been found as independent coronary risk factors. A significant reduction in coronary events is noted when plasma LDL-C levels are decreased and/or HDL-C levels are increased (LeMura L.M. et al 1984).

Sedentary behavior is linked to the development of coronary artery disease, whereas regular exercise is linked to a lower risk of death from coronary artery disease. Increased HDL-C level observed with regular exercise might be partially responsible for this protection. Regular exercise, along with other lifestyle changes (smoking cessation, fat weight reduction, and a low fat diet) are now recommended as an adjunct to medical therapy in an effort to combat Coronary Artery Disease (Fletcher GF et al 1992). Although the favorable effects of regular exercise on HDL-C metabolism have been reported previously, the amount of exercise necessary to increase HDL-C levels has not been well defined. Previous studies suggest that an exercise threshold for the amount and intensity must be met or exceeded before favorable changes in HDL-C levels can occur.

Prolonged exercise can result in lowering of fasting plasma triglyceride (TG) concentration. Repeated exercise on successive days can bring about a progressive decline in elevated TG levels. It is not known whether the lowering of TG is attributable to a specific effect of exercise on lipid metabolism, or to a decreased availability of substrate for TG synthesis secondary to the increased energy expenditure (Superko RH. 1991).

Regular physical activity, as well as a single exercise session, can modify cholesterol metabolism in a good way. Exercise helps to boost the production and activity of a number of enzymes that help to improve the reverse cholesterol transport pathway. Exercise has been shown to improve blood pressure, lower the risk of cardiovascular heart disease improve lipid profile that is raise HDL, lower LDL and Total Cholesterol (Durstine, J.L. and W.L.haskell S1994).

The metabolic system, particularly lipids, is the most important consequence of exercise on the human body. Coronary heart disease is linked to lipids and lipoproteins. Exercise has a positive effect on serum lipid lipoprotein-cholesterol levels. There is decrease in total cholesterol triglyceride and ratio of total cholesterol to HDL-cholesterol. Body weight losses decrease cholesterol and triglyceride level (Krummel D, et al 1993).

The study of the effect of calisthenics exercise on lipid profile has become a major topic of interest to physical educationist in the recent year.

OBJECTIVES OF THE STUDY

- The objective was to measure the lipid profile of sedentary individuals.
- The objective was to develop calisthenics exercise program suited for sedentary individuals.

- The objective was to study the effect of calisthenics exercise program on the lipid profile of sedentary individuals.

METHODOLOGY

Only one group was targeted experimental group, there was no control group. The 40 male sedentary from Khalsa Health Club, Pune, participated in the study and their age ranged between 18-42 years. Training was given to the experimental group only.

Experimental design for this study involves a cross sectional, comparative pre and post test of students in an experimental research. Since only experimental group was taken by the investigator and there was no control group so this study was conducted in a quasi-square experimental design.

Variables of the study

Variables are condition that researcher manipulates, controls or observes. This study is consisting of three variables: Independent variable, Dependent variable and extraneous variable.

Independent Variables

In this study independent variable is 12 week of calisthenics exercise training program. This variable was used to bring about change in the dependent variables. These variables were the base of the training module developed.

Dependent Variables

For this study dependent variables are:

- Total cholesterol.
- High density lipoprotein cholesterol (HDL-C).
- Low density lipoprotein cholesterol (LDL-C).
- Triglycerides (TD).
- Very low lipoprotein cholesterol (VLDL-C).
- Body Mass Index.

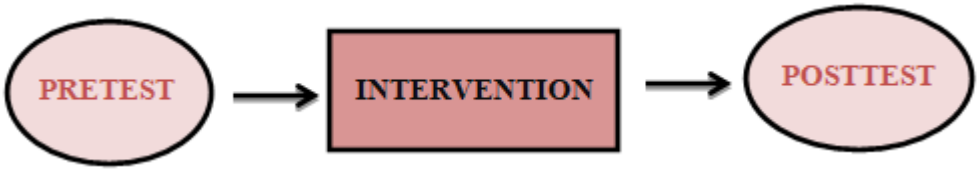
Extraneous Variable

In this study extraneous variable are:

- Diet routine.
- Socio-economic factor.

TESTING PROCEDURES

Test were schedule in the following manner



Tools of the Study

Lipid profile measurement tool ErbaChem 5 Plus V2, Body scale tools which was used in this research, Electronic weight machine for weight measure and Meter tape for height. Samples Height and Weight were measured without shoes and with the least dressing.

Lipid Profile Test

A complete cholesterol test, also called a lipid panel or lipid profile. A lipid profile is a blood test that determines how much cholesterol and triglycerides are present in your blood. A cholesterol test can help determine the risk of plaque accumulation in arteries, which can result in restricted or blocked arteries all over the body (atherosclerosis). High cholesterol levels usually don't cause any signs or symptoms, so a cholesterol test is an important tool. High cholesterol levels often are a significant risk factor for heart disease (Mayo Clinic staff 2013).

Total cholesterol, HDL (also known as good cholesterol), LDL (Bad cholesterol), and triglycerides are all part of the lipid profile. Additional calculated values, such as the HDL/Total Cholesterol Ratio or a risk score based on lipid profile findings, age, sex, and other risk factors, will be included in the report.

Procedure of the study

For this study the members of khalsa Health club, pune were selected as the subjects. The age of subjects ranged between 18 to 42 years. One group will be the target, experimental group. Experimental group participated in calisthenics exercise training program which was conducted for 12 weeks and every week 4 days session. Before calisthenics exercise training period, pre-test had done by laboratory. Samples weight and Height were measured by researcher and assistant for body mass index. Lipid Profile Test - Total cholesterol, High Density Lipoprotein Cholesterol (HDL-C), Low Density Lipoprotein Cholesterol (LDL-C), Triglycerides (TD) and Very Low Lipoprotein Cholesterol (VLDL-C) these factors were measured in Samarth pathological laboratory. BMI measurement, samples weight and Height were measured by body scale and then calculated.BMI = wt (kg) / Height (m) ^{2}.

After the pre-test was over, all the selected subject were exposed to 12 week Exercise training program and every week 4 days session. The program consisted of the following callisthenic exercises; jogging, skipping, front-side-back running, Suryanamaskar, floor pushups, pull-ups, sit-ups, back extension, squat, Squat Thrust, Jump & squat, jump & lunges, lunges, step lunges, calf raises, dips, triceps dips on steps, walking with push up position, Clap& pushups, crunches, back bridge, back extension, bhujangasan, pelvic tilts, pelvic thrust,hip extension, maximus kickback, side leg raise, knee up on steps, front side& back Running, shuttle run, shuttle run with side step, step up and down, V-up, abdominal drag and flag.

At the start of the programme the participants went through entire body workout, so that they get used to the exercise routine.From the 3rd to 7th week Monday was dedicated to upper body

exercises and chest, biceps, triceps and back muscle were concentrated; Wednesday and Sunday was dedicated to cardio, abs and back exercise; Friday was dedicated to lower body exercises and quadriceps, hamstring, gluteus and calf muscle were concentrated

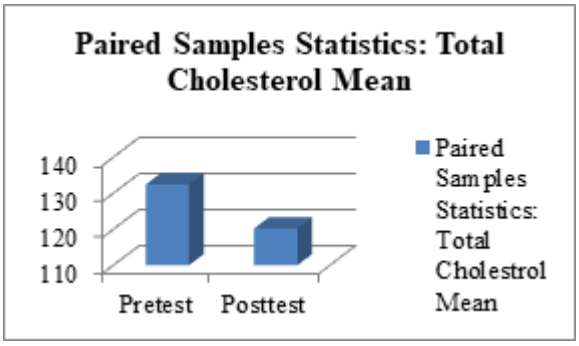
From the 8th to 12th week Monday and Friday was dedicated to cardio, abs and back exercises.Wednesday and Sunday was dedicated to Entire body plyometric exercises and chest, biceps, triceps, back muscle, quadriceps, hamstring, gluteus and calf muscle were concentrated.When the treatment or training period of 12 week was over, post test was conducted.

STATISTICAL TREATMENT

After step wise data collection i.e. pre test, treatment and post test they were processed through a series of statistical analysis; After the designed intervention program was applied the post test data was collected and paired sample t-test was used to determine the effect of intervention program on lipid profile level.

The mean, standard deviation and standard error of mean was calculated. Co relational statistics were used to examine the degree of the relation between exercise and lipid profile. Pearson Correlation method was used for this propose. Post intervention program the post test data was collected and processed for finding the effect of calisthenics exercise training program on lipid profile. The t-test for paired observation was used to determine whether group improved significantly in lipid profile level after training.

1. Analysis of Effect on Total Cholesterol Level



1.1 Paired Samples Statistics: Total Cholesterol

Test	Mean	N	Std. Deviation	Std. Error Mean
Pretest	132.431	35	32.8929	5.5599
Posttest	120.229	35	34.5396	5.8383

The above table shows the Total Cholesterol level of 35 subjects at pretest was 132.431 mg/dl with standard deviation of 32.8929 mg/dl. Similarly at post-test, there was reduction level of cholesterol i.e. 120.229 mg/dl (± 34.5396).

1.2 Paired Samples Correlations: Total Cholesterol

N	Correlation	Sig.
35	0.874	0.001

The above table shows the correlation between pretest and posttest score. It was 0.874 which was statistically significant at 0.001 significance level.

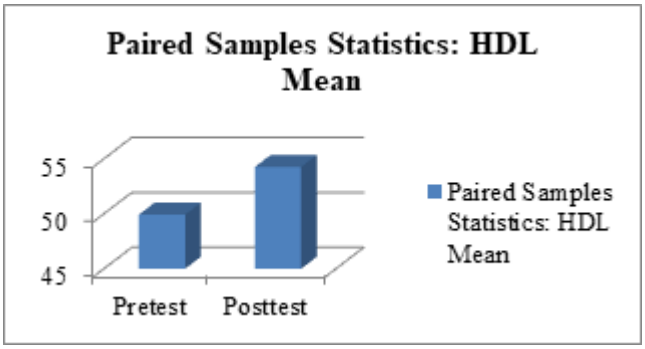
1.3 Pair Sample t-test: Total Cholesterol

Pair	Paired Differences			t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean			
Pre Test and Post test	12.20	17.01	2.87	4.25	34	0.001

Table 4.3 shows the Mean Difference between pretest and post-test score of Total Cholesterol level was 12.20 mg/dl (Table 4.3). This mean difference was tested by pair sample t-test. At 34 degrees of freedom t-value was 4.25 which was statistically significant at 0.05 significance level (p=0.001). This indicates that there was significant reduction in Total cholesterol level.

Change in performance was calculated by subtracting pre-test score from post-test score as researcher is interested in effect on the performance.

2. Analysis of Effect on HDL Level



2.1 Paired Samples Statistics: HDL

Test	Mean	N	Std. Deviation	Std. Error Mean
Pretest	49.906	35	3.1261	.5284
Posttest	54.240	35	2.2027	.3723

The above table shows the HDL level of 35 subjects at pretest was 49.906 mg/dl with standard deviation of 3.1261. Similarly at post test, there was increase in level of HDL i.e. 54.240 mg/dl (± 2.2027).

2.2 Paired Samples Correlations: HDL

N	Correlation	Sig.
35	0.927	0.001

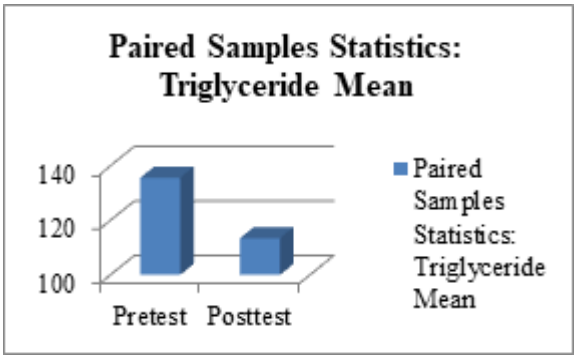
The above tableshows the correlation between pre test and posttest score. It was 0.927 which was statistically significant at 0.001 significance level.

2.3 Pair Sample t-test: HDL

Pair	Paired Differences			t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean			
Pre Test and Post test	-4.3343	1.3619	.2302	18.829	34	0.001

The above table shows the Mean Difference between pretest and post-test score of HDL level was -4.3343 mg/dl. This mean difference was tested by pair sample t-test. At 34 degrees of freedom t-value was 18.829 which was statistically significant at 0.05 significance level (p=0.001). This indicates that there was significant effect on HDL level.

3. Analysis of Effect on Triglyceride Level



3.1 Paired Samples Statistics: Triglycerides

Test	Mean	N	Std. Deviation	Std. Error Mean
Pretest	135.649	35	65.1821	11.0178
Posttest	113.483	35	61.1792	10.3412

The above table shows the Triglyceride level of 35 subjects at pretest was 135.649 mg/dl with standard deviation of 65.1821 mg/dl. Similarly at post-test, there was Decrease in level of Triglycerides i.e. 113.483 mg/dl (± 61.1792).

3.2 Paired Samples Correlations: Triglycerides

N	Correlation	Sig.
35	0.957	0.001

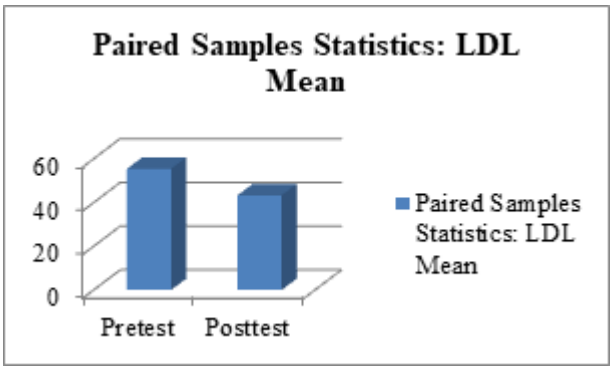
The above table shows the correlation between pre test and post-test score. It was 0.957 which was statistically significant at 0.001 significance level.

3.3 Pair Sample t-test:Triglycerides

Pair	Paired Differences			t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean			
Pre Test and Post test	22.1657	18.9472	3.2027	6.921	34	0.001

The above table shows the Mean Difference between pretest and post-test score of Triglycerides Level was 22.1657 mg/dl. This mean difference was tested by pair sample t-test. At 34 degrees of freedom t-value was 6.921 which was statistically significant at 0.05 significance level (p=0.001). This indicates that there was significant reduction in Triglycerides level.

4. Analysis of Effect on LDL Level



4.1 Paired Samples Statistics: LDL

Test	Mean	N	Std. Deviation	Std. Error Mean
Pretest	55.3960	35	32.29812	5.45938
Posttest	43.2920	35	30.18921	5.10291

The above table shows the LDL level of 35 subjects at pretest was 55.3960 mg/dl with standard deviation of 32.29812 mg/dl. Similarly at post test, there was decrease in level of LDL i.e. 43.2920 mg/dl (± 30.18921).

4.2 Paired Samples Correlations: LDL

N	Correlation	Sig.

35	0.853	0.001

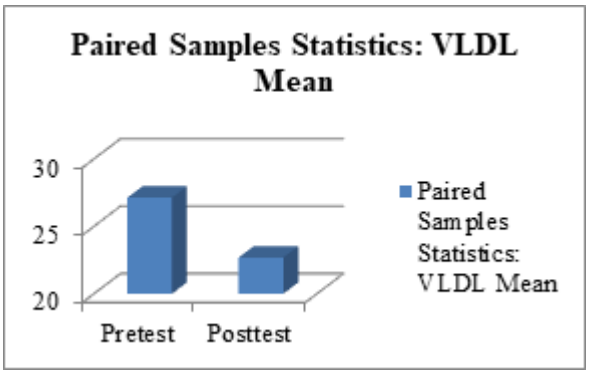
The above table shows the correlation between pre test and posttest score. It was 0.853 which was statistically significant at 0.001 significance level.

4.3 Pair Sample t-test: LDL

Pair	Paired Differences			T	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean			
Pre Test and Post test	12.10400	17.06445	2.88442	4.196	34	0.001

The above table shows the Mean Difference between pretest and post-test score of LDL Level was 12.104 mg/dl. This mean difference was tested by pair sample t-test. At 34 degrees of freedom t-value was 4.196 which was statistically significant at 0.05 significance level (p=0.001). This indicates that there was significant reduction in LDL level.

5. Analysis of Effect on VLDL Level



5.1 Paired Samples Statistics: VLDL

Test	Mean	N	Std. Deviation	Std. Error Mean
Pretest	27.1297	35	13.03643	2.20356
Posttest	22.6937	35	12.23899	2.06877

The above table shows the VLDL level of 35 subjects at pre-test was 27.1297 mg/dl with standard deviation of 13.03643 mg/dl similarly at post-test, there was decrease in level of VLDL i.e. 22.6937 mg/dl (± 12.23899).

5.2 Paired Samples Correlations: VLDL

N	Correlation	Sig.
35	0.957	0.001

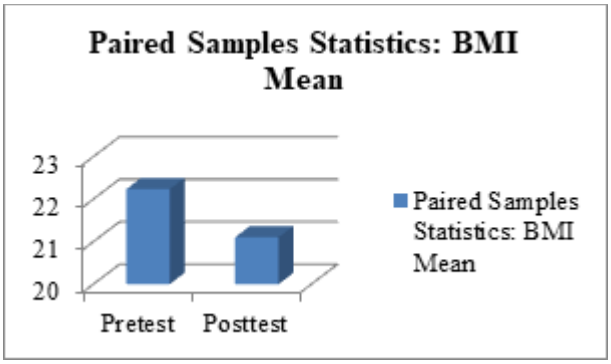
The above table shows the correlation between pre test and post-test score. It was 0.957 which was statistically significant at 0.001 significance level.

5.3 Pair Sample t-test: VLDL

Pair	Paired Differences			T	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean			
Pre Test and Post test	4.43600	3.78784	.64026	6.928	34	0.001

The above table shows the Mean Difference between pretest and post test score of VLDL Level was 4.436 mg/dl. This mean difference was tested by pair sample t- test. At 34 degrees of freedom t-value was 6.928 which was statistically significant at 0.05 significance level (p=0.001). This indicates that there was significant reduction in VLDL level.

6. Analysis of Effect on BMI Level



6.1 Paired Samples Statistics: BMI

Test	Mean	N	Std. Deviation	Std. Error Mean
Pretest	22.2320	35	3.06272	.51769
Posttest	21.1006	35	3.07606	.51995

Table 4.31 shows the BMI of 35 subjects at pretest was 22.2320 with standard deviation of 3.06272. Similarly at post test, there was decrease in BMI i.e. 21.1006 (± 3.07606).

6.2 Paired Samples Correlations BMI

N	Correlation	Sig.
35	0.996	0.001

Table 4.32 shows the correlation between pre test and posttest score. It was 0.996 which was statistically significant at 0.001 significance level.

6.3 Pair Sample t-test: BMI

Pair	Paired Differences			t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean			
Pre Test and Post test	1.13143	.28921	.04889	23.145	34	0.001

Table 4.33 shows the Mean Difference between pretest and post test score of BMI was 1.13143 (Table 4.33). This mean difference was tested by pair sample t-test. At 34 degrees of freedom t-value was 23.145 which was statistically significant at 0.05 significance level (p=0.001). This indicates that there was significant reduction in BMI.

RESULT OF STUDY

The goal of this study was to see how calisthenics exercise affected the lipid profile of inactive people.

It had been hypothesized that there would be significant effect of calisthenics exercises on Lipid Profile variables with Total Cholesterol of sedentary individuals. The study reveals that there was significant effects of calisthenics exercises was found in ($t = 4.25$, $p<.05$) Total Cholesterol Level of experimental group. That means the total cholesterol of sedentary subject decreased after the calisthenics exercises training program and it was statically as well as numerically significant.

It was found in ($t = 18.829$, $p<.05$) Level of HDL cholesterol (High Density Lipoprotein Cholesterol) in the experimental group. That means the High Density Lipoprotein Cholesterol (HDL) of sedentary subject increased after the calisthenics exercises training program and it was statically as well as numerically significant.

It was found in ($t = 6.921$, $p<.05$) Triglycerides Level of experimental group. That means the Triglycerides of sedentary subject decreased after the calisthenics exercises training program and it was statically as well as numerically significant.

It was found ($t = 4.196$, $p<.05$) level of low-density lipoprotein cholesterol (LDL) in the experimental group. That means the Low-density lipoprotein (LDL) cholesterol of sedentary subject decreased after the calisthenics exercises training program and it was statically as well as numerically significant.

It was found ($t = 6.928$, $p<.05$) level of very low density lipoprotein cholesterol (VLDL-C) in the experimental group. That means the Very low density lipoprotein cholesterol (VLDL-C) of sedentary subject decreased after the calisthenics exercises training program and it was statically as well as numerically significant.

It was found in (t = 23.145, p<.05) Body Mass Index of experimental group. That means the Body Mass Index of sedentary subject decreased after the calisthenics exercises training program and it was statically as well as numerically significant.

IMPLIES OF THE STUDY

1. The study wouldhelp the physical education teachers to know the effect of exercise on lipid profile.
2. The results of present study would help to give appropriate treatment to the lipid profile patient.
3. The finding of the study would help lipid profile patient to improve good health.
4. This study may motivate other investigators to takes up similar studies.
5. The study would be helpful to medicine and physical education science.
6. This study would prove the importance of calisthenics exercise in decrease of cardiac diseases.
7. This study would prove that we can use calisthenics exercise instead of pharmalogical prescription.

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