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NAIL GROWTH IN CORRELATION WITH BLOOD LIPID

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ABSTRACT
The aim of the present study is to assess the linear nail growth of the left thumb nail in correlation with the levels of serum lipids in Iraqi subjects. Forty healthy volunteer male subjects were included in this study their ages ranged between 40-49 years with a mean of 44.67 years $\pm$ 2.90. The nail growth of the left thumb nail was measured for one month and the mean was 0.10 mm /day. Their weights were measured with a range from 60-95 kg with a total mean of 76.77 kg $\pm$ 10.95. Results revealed that the correlation was significant positive (+0.86) (P<0.05) between nail growth and high density lipoprotein (HDL-cholesterol), whereas there was a significant negative correlation (P< 0.05) between nail growth and each of: serum levels of total cholesterol (-0.89), LDL-cholesterol (-0.89), triglyceride (-0.71) and VLDL (-0.71). This research confirm that the nail is very important structure and can be considered as a mirror reflects what is going on inside the human beings and we can conclude that the nail could be considered as a mirror for the body and its growth reflect the levels of serum lipids.

KEYWORDS: nail growth, total cholesterol, triglyceride, HDL, LDL, VLDL.

INTRODUCTION
The nail although looks a small structure, but it can be considered as a mirror that can reflect the pathological changes that occur inside the body. These changes will appear as nail deformities or changes in its appearance, so examining doctors, weather dermatologist or internist should not skip nail from examination as the nail changes might be the only sign that lead us to the correct diagnosis. So it is important for clinicians to understand and accurately describe nail findings if they are to communicate accurately with their colleagues and avoid the vagueness that often surrounds nail pathology.

METHODOLOGY
A total number of 40 healthy volunteers' male subjects with healthy nails were evaluated in Department of Dermatology and Venereology of Baghdad Teaching Hospital, during a time period from November1, 2000, through April 30, 2002.

Procedures of nail growth measurements
A T-shaped mark was etched on the proximal part of the left thumb nail plate close to the distal border of the lunula, using a sharp large needle guided by a plastic mould in which a T-shaped guide was cut (Figure).The plastic mould was made from half of the body of a disposable syringe, cut longitudinally and in which the T-shaped guide was made at one of its ends. The mould was placed over the dorsal surface of the nail plate, so that the T-cut was perpendicular to the proximal nail fold. The measurements were done from the proximal nail fold to the etched mark. The first reading was made immediately after etching (X-reading) and the second reading one month later (Y-reading). A measurement was carried out using a vernier caliper. All technical procedures were done under an x3 large diameter magnifying lens suspended on a stand fitted with a laterally positioned light projector when it is needed. The linear growth of the nail plate was calculated using the following formula:

$$\frac{Y - X}{No.\,of\,days\,between\,observations} = nail\,growth/day$$

Weight
The weight of each volunteer was measured during initial x-reading of the finger nail.
Plasma lipid profiles
The plasma lipid profiles of each volunteer were measured. The volunteers were sent to the central public health laboratory. The investigation including the plasma lipid concentration of:
1- Total cholesterol.
2- Triglyceride.
3- LDL cholesterol.
4- HDL cholesterol.

5- LDL.
All hypertensive and smoker individuals are excluded from the study (to exclude any abnormal effect on nail growth).

Statistical analysis
The statistical analysis in my work include: frequencies, relative frequencies, means and standard deviation for selected variable were done and student's t-test was used to test the differences between variables and to measure the level of significant differences in the given data. The correlation between different groups of data was done.
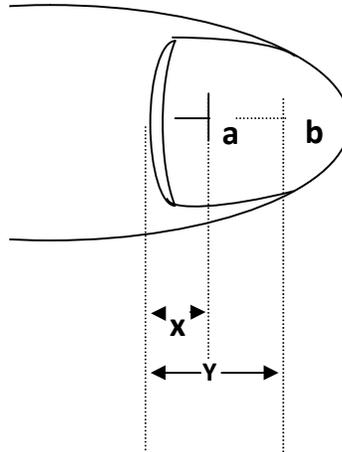
FIGURE 1: Methods of nail growth measurement

RESULTS

Forty healthy male volunteer subjects were evaluated. The total mean rate of nail growth was 0.10mm/day ± 0.0088.

Nail growth and total cholesterol level (figure 2)

Plasma total cholesterol level of all volunteers was measured and ranged between 115-285 mg/100ml with a total mean rate of 187.2 mg/100 ml ± 44.87. We divided the volunteers into 5 groups, according to their total cholesterol level and we found that there was a decrease in the nail growth with the increasing level of total cholesterol. So there is a negative correlation between nail growth and total cholesterol level but this correlation not reach the statistical significant level, P>0.05.

r = -0.89704
P < 0.05
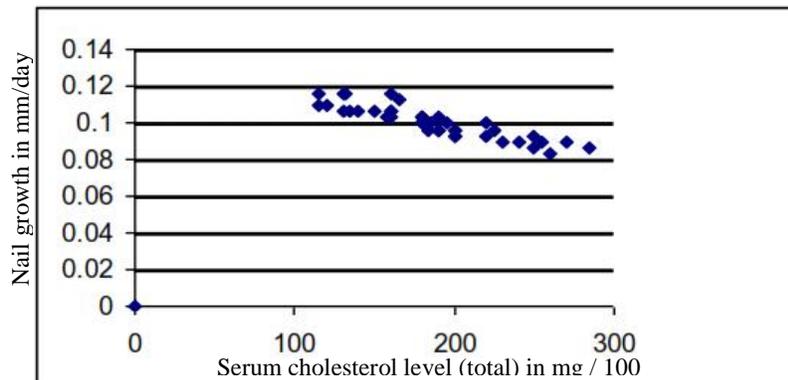
FIGURE 2: Scattered diagram (correlation between nail growth and serum cholesterol level)

Nail growth and low density lipoprotein (LDL cholesterol) (figure 3)

The plasma LDL cholesterol level of all volunteers was measured and ranged between 45-218 mg/100ml with a total mean rate of 117.5 mg/100ml ± 41.62. We divided the volunteers into 5 groups according to their LDL cholesterol level and we found that there was a decrease in the nail growth with increasing in LDL cholesterol level [1, 2]. So there is a negative correlation between the nail growth and LDL cholesterol level but this correlation not reach statistical significant level, P>0.05.

Nail growth and high density lipoprotein (HDL cholesterol) (figure 4)

The plasma HDL cholesterol level of all volunteers was measured and ranged between 30-56 mg/100ml with a total mean rate of 42.05 mg/100ml ± 6.87. We divided the volunteers into 5 groups according to their HDL cholesterol level and we found that there was increase in the nail growth with increasing in HDL cholesterol level. So there is a significant positive correlation between nail growth and HDL cholesterol level, P<0.05.

Nail growth and very low density lipoprotein (VLDL) (figure 5)

The plasma VLDL level of all volunteers was measured and ranged between 9-66 mg/100ml with a total mean rate of 27.6 mg/100ml ±12.52. We divided the volunteers into 5 groups according to their VLDL level and we found that there was a decrease in the nail growth with increasing in the VLDL level. So there is a significant negative correlation between nail growth and VLDL level, P<0.05.

r = -0.89505
P < 0.05
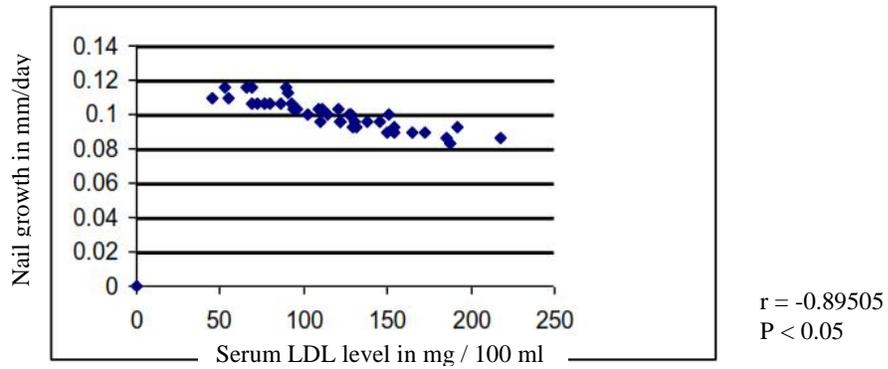
FIGURE 3: Scattered diagram (correlation between nail growth and serum LDL level)

r = 0.860764
P < 0.05
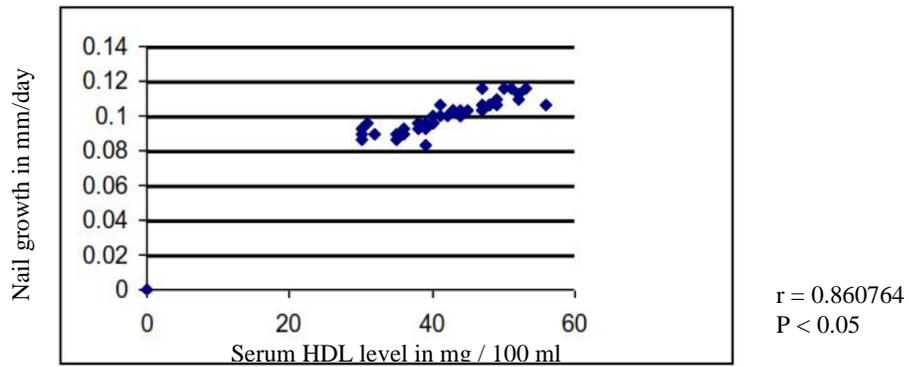
FIGURE 4: Scattered diagram (correlation between nail growth   and serum HDL level)

r = -0.71189
P < 0.05

Serum VLDL level in mg / 100 ml
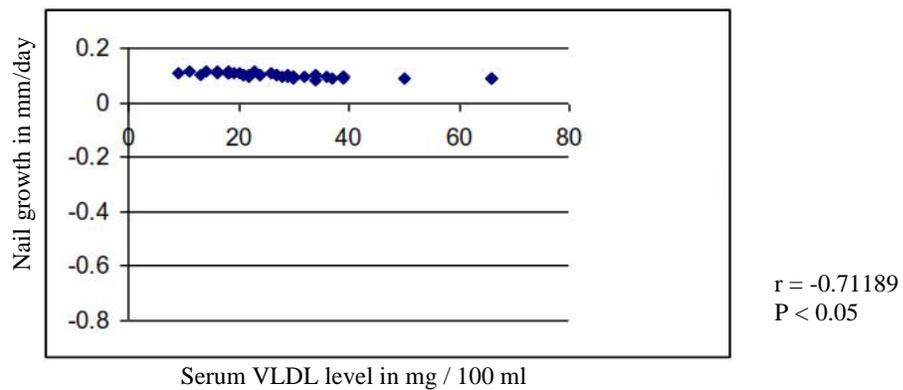
FIGURE 5: Scattered diagram (correlation between nail growth and serum VLDL level)

r = -0.71302
P < 0.05

Serum triglyceride level in mg / 100
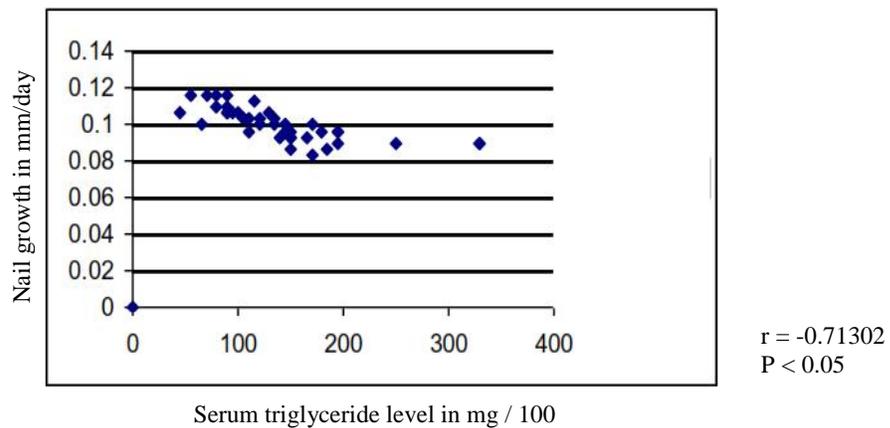
FIGURE 6: Scattered diagram (correlation between nail growth and serum triglyceride level)

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Nail growth and triglyceride level (figure 6)

The plasma triglyceride level of all volunteers was measured and ranged between 45-330 mg/100ml with a total mean rate of 138.1 mg/100ml ± 62.62. We divided the volunteers into 3 groups according to their triglyceride level and we found that there was a decrease in the nail growth with increasing in triglyceride level. So there is a negative correlation between nail growth and the triglyceride level but this correlation not reach statistical significant level, P>0.05.

DISCUSSION

Approximately 10% of dermatologic patients have nail alteration[3-6.] Nail growth was reported to be impaired in patients with atherosclerosis[7.] So the nail growth could be well correlated with the plasma lipids. In cases of impaired peripheral circulation such as arteriosclerosis or thromboangiitis obliterans, the rate of fingernail growth is retarded [8.]

So we can say that proper perfusion on nail matrix is an important factor in nail growth.Atherosclerosis can also producing painful nails and loss of digital skin as occur in subclavian atherosclerosis[9]. The infiltration and deposition of lipoproteins into tissues, however, are not limited to the arterial tree. Lipoprotein can also enter into skin, subcutaneous tissue and tendons, where lipids can accumulate to produce xanthomas[10]. The present study had shown that elevated total cholesterol level and elevated LDL cholesterol level associated with a decrease in the nail growth, and this mean there was a negative correlation between nail growths and both total cholesterol level and LDL cholesterol level in spite of this correlation didn't reach statistical significant level. Triglyceride and VLDL levels were found to be negatively correlated with the nail growth, so high plasma lipid of triglyceride or VLDL could impair the perfusion of nail matrix and impairing the nail growth. The level of triglyceride although high and associated with a decrease in the nail growth but this correlation didn't reach the statistical significant level, while the VLDL level had been reach the significant statistical level, in correlation with the nail growth, P<0.05.HDL cholesterol is considered as good cholesterol and has protective function against atherosclerosis (antiatherogenic)[11,12.] The present work has found a positive correlation between the nail growth and the level of HDL cholesterol (P<0.05), so healthy nail is very good indicator and marker of the healthy blood vessels and healthy coronary arteries, so nail growth measurement should be added to other tests that are needed to asses the healthy of blood vessels specially coronary arteries.

CONCLUSION

We can conclude that the nail could be considered as a mirror for the body and its growth reflect the levels of serum lipids and we can confirm that the nail is very important structure and can be considered as a mirror reflects what is going on inside the human beings.

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