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**Serum Calcium, Phosphate and Alkaline Phosphatase in
Cigarette Smokers**

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DEDICATION

**To my father, mother, sisters, brothers
and to my friends.**

I dedicate this work.

Acknowledgments

I would like to express my profound thanks to my supervisor, Dr. Bader Eldien Hassan Elabid, for his fruitful guidance, unlimited assistance, encouragement and sustained interest throughout the course of this work.

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Abstract

A prospective study conducted during the period December 2007 to march 2008, compared serum levels of calcium, phosphate and alkaline phosphatase activity of 50 apparently healthy cigarette smoker volunteers (as a test group) and 30 apparently healthy volunteers (as a control group). All were selected randomly from the University of Science and Technology in Omdrman, Sudan. The test group and the control group, were matched in term of age, socioeconomic status and sex (all were males). The serum levels of calcium, phosphate and alkaline phosphatase activity were measured using A25 auto analyzer from Biosystem Company, Barcelona, Spain. Serum calcium was significantly reduced, while serum phosphate and alkaline phosphatase were significantly raised in the test group compared to the control group. Mean \pm SD for smokers versus controls:

(8.71 \pm 0.32) versus (9.66 \pm 0.51) mg/dl (P<0.05); for serum calcium.

(3.74 \pm 0.52) versus (2.82 \pm 0.38) mg/dl (P<0.05); for serum phosphate.

(109.04 \pm 7.85) versus (96.06 \pm 6.36) U/L (P<0.05); for serum alkaline phosphatase activity.

In the test group, serum calcium was negatively correlated, while serum phosphate and alkaline phosphatase activity were positively correlated with both the duration of smoking (in years) and the number of cigarette smoked per day.

From this study, it is concluded that; cigarette smoking is associated with low serum calcium that correlates negatively with both; the duration of smoking and the number of cigarettes smoked per day. In addition, serum phosphate and alkaline phosphatase are increased, and have a positive correlation with both; the duration of smoking and the number of cigarettes smoked per day.

أجريت هذه الدراسة التوقعية خلال الفترة من ديسمبر 2007 حتى مارس 2008 . حيث تمت مقارنة مستويات (الكالسيوم والفوسفات والفوسفاتيز القلوي) عند 50 من المدخنين الأصحاء مع 30 من الأصحاء غير المدخنين كمجموعة تحكم (مجموعة ضابطة). تم اختيار المدخنين والمجموعة الضابطة عشوائياً من أعضاء هيئة التدريس والطلاب والعاملين بجامعة العلوم والتقانة بحيث يتطابقون في العمر والحالة الاجتماعية والجنس (ذكور). كان هناك انخفاض ملحوظ وذو دلالة معنوية في مستوى الكالسيوم وارتفاع ملحوظ وذو دلالة معنوية في مستوى الفوسفات والفوسفاتيز القلوي حيث كان الاحتمال الاحصائي للمقارنة أقل من 0.05 في كل من المستويات الوسيطة للكالسيوم ، الفوسفات والفوسفاتيز القلوي وذلك عند مقارنة المستوى الوسطي عند المدخنين مقارنة بمجموعة التحكم وكانت النتائج كالآتي:

(المستوى الوسطي \pm الانحراف المعياري عند مجموعة المدخنين مقارنة بالمجموعة الضابطة)

.0000 000 00 0000000000 00000000 } 000000 / 000000) $0.51 \pm (9.66 \text{ 000000}) 0.32 \pm 8.71 \{ ($

.0000 000 00 00000000 00000000 }000000 / 000000) 0.38 ± 2.82 (000000) 0.52 ± 3.74){

$$\left\{ \frac{\text{mean} \pm \text{SD}}{\text{mean} \pm \text{SD}} \right\} \text{ (95\% CI) } 6.36 \pm (96.06 \text{ } 7.85) \pm 109.04 \text{ (}$$

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من هذه الدراسة , نخلص للآتى: التدخين يؤدي الى انخفاض مستوى الكالسيوم فى مصل الدم كما ان مستوى الكالسيوم يرتبط ارتباطا سالباً مع عدد السجائر المدخنة فى اليوم و كذلك مع مدة التدخين بينما يرتفع مستوى الفوسفات والفوسفاتيز الالقلوى فى مصل الدم عند المدخنين ويكون لها ارتباط موجب مع عدد السجائر المدخنة فى اليوم وكذلك مع مدة التدخين.

List of abbreviations

ALP	Alkaline phosphatase
CAMP	Cyclic adenosine monophosphate
ECF	Extra cellular Fluid
PTH	Parathyroid hormone
PTH rp	Parathyroid hormone related peptide

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