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# *The Effect of Intravenous Disodium Ethylenediaminetetraacetic Acid (EDTA) Upon Bone Density Levels*

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*ABSTRACT:* Sixty-one routine patients were studied in a general practice environment following approximately three months of routine therapy including EDTA treatment. The evidence indicates that regardless of sex there was no decrease in bone density readings following EDTA therapy and in fact in those patients who had some degree of osteoporosis there was a slight but statistically significant improvement in bone density readings. These results seem to indicate that rather than a negative effect on bones EDTA therapy might in some cases be beneficial to bone growth.

## Introduction

As the average age of the population increases it becomes increasingly clear that osteoporosis has and will become one of the major problems affecting adults, especially women.[1] As well there is a belief that treating patients with EDTA therapy will decrease the bodies stores of calcium and will promote if not cause osteoporosis in those receiving this treatment. For example, in the very popular *U.S. News and World Report*[2] writer Stephen Budiansky writes that " . . . some patients suffered from extreme calcium depletion and osteoporosis or bone thinning as a result of the treatments (EDTA)!!" While this belief is wide spread and commonly quoted; studies showing before and after bone scans following EDTA treatments are ap-

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parently nonexistent. It is the purpose of this study to examine the affect of EDTA therapy in a private practice environment on the bone densitometry of patients.

## Review of the Literature

Many variables can play a roll in the development of osteoporosis. Some of these include calcium deficiency, lack of regular exercise, genetic factors, dietary excesses and smoking.[3] With this condition the bone that exists has a chemical composition that is normal but because there is less bone mass, the bones become brittle, weak and more susceptable to fractures. Many treatments have been attempted throughout the past years[4-7] with various degrees of success.

The question that this paper is hoping to answer in some way is what effects EDTA has on bone structure? Does EDTA cause osteoporosis? Many physicians involved in the use of EDTA have observed that bone structure actually improves with the administration of EDTA. The explanation of this apparent paradox could be found in the role of the parathormone in relationship to osteoblastic function.[8]

When EDTA is administered intravenously into the body there is a complexing of serum calcium which is then excreted through the renal tubules. This drop in serum calcium causes an increase in parathormone levels. The increased parathormone levels could have two important results. First a release of calcium from metastatic calcium deposits, and also the conversion of preosteoblasts to osteoblasts.

The question which we hope to answer in this investigation is does EDTA therapy have a positive or negative effect on bone density?

## Materials and Methods

Sixty-one routine patients were studied in a general practice environment. The age and sex distribution is summarized in Table 1.

All patients underwent a careful initial clinical examination. Each patient was then tested using a single photobone densitometer manufactured by Norland. All testing was performed using standard methods as indicated by the equipment manufacturer.[9] The bone densitometer was calibrated both prior to and following each test.

All patients underwent subsequent retesting following EDTA therapy with supportive multivitamin-trace mineral supplementation described more fully in other reports by the authors.[10,11] The initial

**TABLE 1**

**Age and Sex Distribution**

| | Number | Mean Age | Variance | SD |
|---|---|---|---|---|
| Male Group | 23 | 64.39 | 32.16 | 5.67 |
| Female Group | 38 | 65.13 | 96.49 | 9.82 |
| Total Group | 61 | 64.85 | 71.43 | 8.45 |

versus subsequent bone densitometry readings were compared as to differences pre and post EDTA therapy, with additional investigation as to the differences between males and females pre and post EDTA therapy. Finally the difference between those patients with lower than predicted bone densitometries (osteoporosis group) were compared to those with higher than or normal predicted for age bone densitometries.

## Results

Table 2 summarizes the results of the total group.

**TABLE 2**

**Total Group Pre & Post Test**

| | Pretest | | Post Test | | T. Score |
|---|---|---|---|---|---|
| | Mean | S.D. | Mean | S.D. | |
| Number of EDTA Infusions | .67 | 2.19 | 33.30 | 13.14 | 20.04* |
| Bone Density (Actual) | .702 | .137 | .706 | .133 | .894 |
| Bone Density (Pred.) | .697 | .104 | .697 | .104 | .088 |

N = 61 *P > .001

Tables 3 and 4 summarize the results of the pre and post test when males and females were separated.

Table 5 summarizes the results of the pre and post tests when those patients with lower actual bone densities than predicted for their age.

## Discussion

It is apparent from the results of the total group reported in Table 2 that there is no decrease in actual measured bone density levels from protest to post test in the total group. In fact, there is a slight increase in the bone density results measured, but this increase is not statistically significant. When the test results are broken down to compare males versus males pre and post test and females versus females pre and post test the results remain essentially the same. When looking at the female group reported in Table 3 once again it can be shown that the actual bone density levels increase slightly from pretest to post test about once again this increase was not statistically significant. In the male group reported in Table 4 the bone densitometry readings that were measured remained essentially constant from pretest to post test. Possibly the most interesting group looked at was the group which had bone densitometry readings below

**TABLE 3**

**Females Pre and Post Test**

| | Pretest | | Post Test | | T. Score |
|---|---|---|---|---|---|
| | Mean | S.D. | Mean | S.D. | |
| Number of EDTA Infusions | .55 | 1.11 | 32.24 | 12.52 | 15.52* |
| Bone Density (Actual) | .629 | .108 | .635 | .107 | 1.13 |
| Bone Density (Pred.) | .626 | .055 | .625 | .056 | .087 |

N = 23 *P > .001

**TABLE 4**

**Males Pre and Post Test**

| | Pretest | | Post Test | | T. Score |
|---|---|---|---|---|---|
| | Mean | S.D. | Mean | S.D. | |
| Number of EDTA Infusions | .87 | 1.96 | 35.04 | 14.22 | 12.59* |
| Bone Density (Actual) | .821 | .087 | .822 | .076 | .118 |
| Bone Density (Pred.) | .814 | .036 | .814 | .036 | .000 |

N = 23 *P > .001

that which would be predicted for age on the pretest. This group consisted of 25 individuals and was called the osteoporosis group. These results are reported in Table 5. Over the course of the treatment from pretest to post test there is actually a two percent increase in the

**TABLE 5**

**Osteoporosis Group**

| | Pretest | | Post Test | | T. Score |
|---|---|---|---|---|---|
| | Mean | S.D. | Mean | S.D. | |
| Number of EDTA Infusions | .56 | 1.66 | 34.60 | 19.25 | 9.26* |
| Bone Density (Actual) | .624 | 1.34 | .636 | .134 | 2.29** |
| Bone Density (Pred.) | .707 | 1.15 | .702 | .112 | 1.08 |

N = 25 *P > .001
**P > .05

bone densitometry readings measured in this group. This difference was statistically significant at the .05 level of confidence.

## Summary

While it is clear that osteoporosis has become one of the major problems affecting our society and especially women in our society there is a great deal of controversy as to treatment of this disease process and also the effect that EDTA therapy will have on the body's storage of calcium. The evidence indicates, within the limits of this study which was conducted in a private practice environment, that not only does EDTA therapy not cause calcium depletion of the bones (osteoporosis) but will, in fact, stimulate a regrowth of the bone in those patients affected with osteoporosis. Sixty-one routine private practice patients were studied before and after approximately 3 months of routine therapy including EDTA treatment and general supportive care including multi-vitamin trace mineral supplementation. The evidence indicates that it is possible EDTA therapy might enhance bone growth in patients with osteoporosis and has no negative effect on patients with normal bone density readings.

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