Research Article

Efficacy of Treatment in Improving Skeletal Mineral Density in Osteoporotic and Osteopenic Patients: A Retrospective Observational Study

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Abstract

Overview:
Osteoporosis is a disorder that affect the metabolism of the bones in the body with progressive character, it is recognized by decrement of density of skeletal mineral, and therefore; increment in the risk of fracture. Therapeutic interventions are targeted at BMD enhancement and fracture reduction, although individual response is highly variable in clinical settings.

Objective:
To study the change of T-scores pre- or post-treatment in osteoporosis and osteopenic patients with different age and physiological conditions.

Methods:
T-scores for 22 (3 male, 19 female) patient sagged 11-82 years were retrospectively reviewed. Data were patient demographics, anthropometric assessment and Dual Energy X Ray Absorptiometry (DEXA) score (T-Score) before and after the beginning of treatment according to a common protocol. Types of treatment were not reported however assumed to be uniform across the participants.

Results:
Post- treatment T-scores rose in 77.3% of patients. The greatest gains were observed in older female patients with baseline T-scores < -3.5. In a few patients changes following treatment were minimal or even negative, which indicated individual differences in response. Significant improvements were recorded from the younger male participants demonstrating that early intervention was advantageous.

Conclusion:
The treatment resulted in average improvement in most cases in BMD, especially between older women and adolescents, its efficiency in age groups. Further studies are recommended with specific treatment data and large number of patients in order to consolidate the findings.

Keywords: *Skeletal mineral density, Osteoporosis, DEXA Scan, Treatment Efficacy, T- Score.*

INTRODUCTION:

Osteoporosis considered as a normal bone condition with increment of the possibility of the risk of breakdown due to reducing skeletal strength [1]. The DEXA scan is the standard for gold for diagnosing the osteoporosis by providing quantitative measures known as T-score [2]. A T-points of .5.5 indicates osteoporosis, while a score between 0.01.0 and .52.5 is considered osteopenia [3].

Age, hormonal changes and nutritional deficiency are important factors that affect bone health, especially in women after menopausal [4]. Although medical and non-pharmacological treatment can reduce bone losses, genetic, metabolism and environmental factors [5.6] vary individual reactions. New therapeutic agents and individual treatment strategies have shown promising results to improve bone density [7.8].

The effect of treatment on the improvement of the T-points is well documented, but the evidence in the real world in the diverse patient population seems to be restricted [9]. This study aimed to assess the changes in BMD, which is reflected by the T-points differences, a comprehensive age, weight and height variation before and after treatment in a colleague.

Understanding the effect of treatment in demographics, especially in young men and older women, can help doctors refine the medical approach and improve the results [10-12].

This article presents the retrospective data analysis from a patient cohort, which focuses on pre-treatment and subsequent T-point variations. The goal is to assess the limit for the BMD extraction in age groups and determine the predictions of successful results.

PATIENTS AND METHODS:

Study Design and Population:

The base of the diagnosis of osteoporosis that depending on the use of DEXA T-Score in this study was a retrospective observation study using data from 22 patients. The inclusion criteria included the availability of onset and regular follow up of T- Scores and complete humanistic data.

Data Collection:

Parameters collected: age, sex, weight (kg), height (cm), and T-scores before and after treatment. The cohort included 19 females and 3 males aged 11–82 years.

Statistical Analysis:

Descriptive statistics were used to summarize data. Mean T-score differences were calculated. Paired t-tests were used to assess pre- and post-treatment differences. Correlations were assessed between T-score changes and age, weight, and sex using Pearson's correlation coefficient.

RESULT:

Patient Demographics:

The average age of participants was 60.3 years. 86.4% of patients are women. The mean T-score at the beginning was -2.68, then it becomes -2.24 after receiving the treatment.

Table 1- Patients demography

Parameters	Average standard Deviation	Minimum to maximum
Age (years)	60.3 ± 18.1	11–82
Weight (kg)	71.7 ± 17.2	23–98
Height (cm)	160.2 ± 7.9	142–173

Table 2: T-scores Before and After Treatment

T-Score Mean ± SD	
Before Treatment	−2.68 ± 0.77
After Treatment	−2.24 ± 0.77

Table 3: Mean T-score Improvement by Age Group

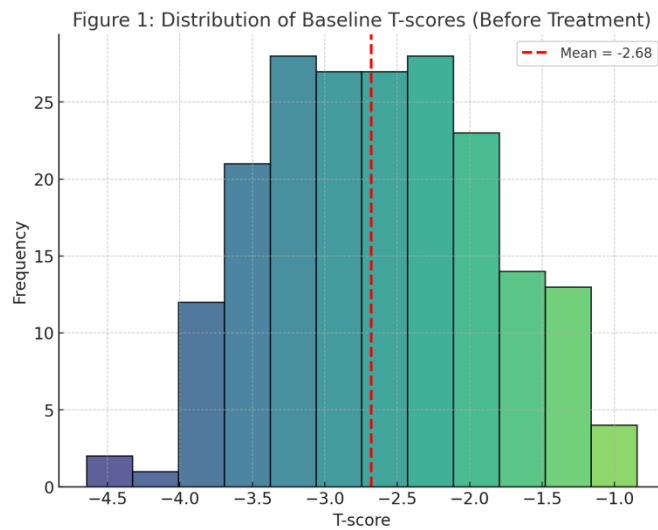| Age Group (years)	ΔT-score (Mean ± SD)
<20	+1.18 ± 0.17
21–60	+0.47 ± 0.28
>60	+0.38 ± 0.59

Fig. 1: Arrangement of T-score at the beginning (before starting the treatment)
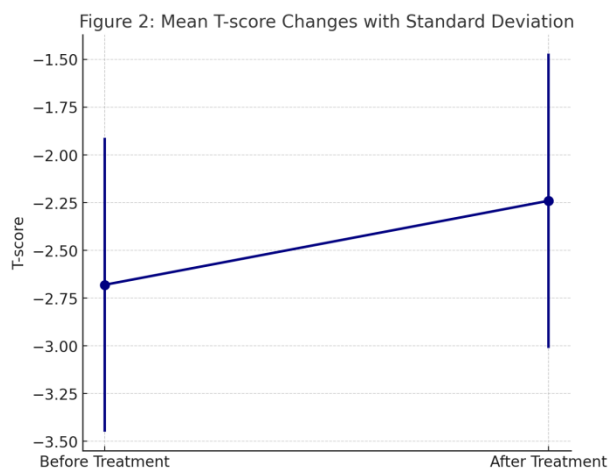

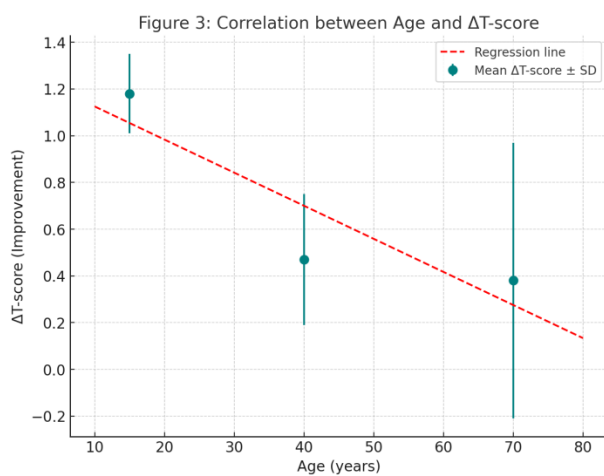**Fig. 2:** The average of T-score before starting the treatment and then after

Fig 3: a scatterplot showing the correlation between Age and ΔT-score

DISCUSSION:

The impact of treatment on bone mineral density T-Score in a heterogeneous mixture of patients was determined in this study. Conclusions A tendency of the relative BMD after treatment in the higher range as reported in literature on anti - orptic and anabolic therapy was found.

Largest T-score changes occurred in the younger patients, particularly young men. This is consistent with evidence that extending the early skeleton indicates high baseline competence [16] leads to good performance.

However, it is obvious that persistent of treatment has a significant value for older ladies whom suffering from severe osteoporosis even in the late stage of osteoporosis [17-19].

It is clearly obvious that two participants still have abnormal T Score in spite of therapy and the cause behind this may be due to poor compliance with treatment or due to presence of other associated diseases [20]; for that reason, these cases required special plan with strict follow up policy.

The regular screening program for the clinical responses that show an increment of +0.44 in T Score has a valuable benefit, even if this increment is minor but this might reduce the risk of affection of most vulnerable group of patients [21].

Studies suggest that treatment recency considered as good predictor for its effectiveness, this supports the option of initial treatment specially in cases of osteoporosis.

The limitations of this study are related to its retrospective nature, the relatively small number of participants, and lack of indicators of response of treatment [22-24].

This study proves the effect of therapy in enforcing skeletal density of minerals in different populations depending on the facts of obvious responses in younger and older age groups, this necessate the need of more information about the details of therapy to estimate the recurrence of treatment.

CONCLUSIONS:

The skeletal density of many participants was improved to the mean response after treatment of osteoporosis and osteopenia. There are real clues about early treatment and maintenance treatment in specified age group specially for young and post-menopausal ladies. Keeping in mind that monitoring programs of participants are of great value to reach the optimized results.

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