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LETTER TO EDITOR

Evaluation of the Relationship between Systemic Osteoporosis, Dietary Ca Intake and the Reduction Of Residual Ridges In An Edentulous Patient: An *In Vivo* Pilot Study

DESHPANDE S S*, SARIN S P**

ABSTRACT

In recent years, there has been an obvious increase in the elderly population. Osteoporosis, a systemic disease in the elderly, shows a decrease in the skeletal mass without alteration in the chemical composition of bone.

In edentulous patients, reduction of the residual ridge (RRR) is one of the most important factors affecting denture support, retention, stability and masticatory function. The aetiology can be multifactorial, eg: dietary Ca intake, hormonal, etc.

This study investigated the relationship between systemic osteoporosis, dietary Ca intake and RRR in elderly edentulous patients. Systemic osteoporosis was evaluated by measuring BMD by ultrasound. Residual Ridge Resorption was evaluated by OPG (Wical and Swoop Analysis) and Dietary case history was taken to evaluate Ca intake. Residual ridge resorption was found to be directly proportional to the age of the patient and to the degree of osteoporosis, inversely proportional to dietary Ca intake and was found to be more common in females.

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Introduction

Osteoporosis is a progressive systemic skeletal disease characterised by low bone mass and micro-architectural deterioration of the bone tissue, with a consequent increase in bone fragility and susceptibility to fracture. Osteoporosis has a variety of risk factors such as age, sex, diet, smoking and some systemic conditions. Osteoporosis is thought to have an effect on the systemic bone condition (including mandible) and increased chances of bone resorption. Thus, the following study which was carried out at VSPM's Dental College and Research

Centre in Jan.2009 revealed the relationship between osteoporosis, residual ridge resorption and dietary Ca intake.

Aim and Objectives

To evaluate the co-relationship between Age, Sex, Degree of Osteoporosis, Dietary Ca Intake and Residual Ridge Resorption in Geriatric Patients wearing Complete Denture.

Procedure

In all 24 completely edentulous patients without any signs of systemic or oral pathology, three basic procedures were carried out for each patient viz.-

- Measurement of systemic osteoporosis:
- Bone mineral density- by ultrasound.
- Measurement of Residual Ridge Resorption :
- OPG (Wical and Swoop Analysis)

- Dietary case history: For Ca intake

height. $3x-y$ gives ridge resorption as in following diagram [Table/Fig 3].

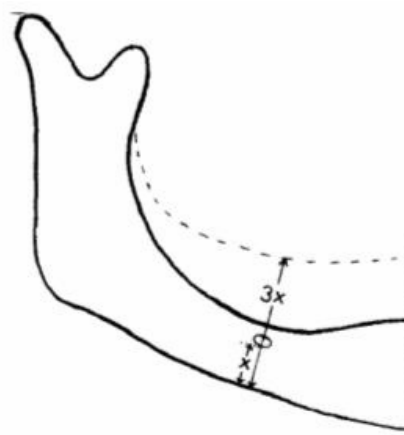
Sample Size

[Table/Fig 1] Total No of Patients: 24

Males: 12, Females: 12

(Table/Fig 1)

Age groups	No. of males	No. of females
55-65 yrs	4	4
65-75 yrs	4	4
75-85 yrs	4	4



(Table/Fig 3)

1 Densitometric Test

This test helps to assess the density and structure of the skeleton and appears to predict fracture risk in the elderly. The apparatus is relatively inexpensive, portable, and uses no radiation, but can be used only in peripheral sites (eg, the heel) where the bone is relatively superficial. Ultrasound devices measure the speed of sound (SOS), as well as specific changes in sound waves (broadband attenuation or BUA) as they pass through bone. These measurements provide information on fracture risk by providing an indication of bone density and possibly, also information on the quality of the bone. Thus, the t-score of each patient was assessed and inference was made about the osteoporosity or osteopeniacity of the patient [Table/Fig 2].

(Table/Fig 2)

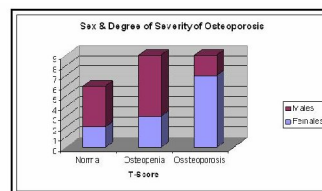
T-score	What the score means
2.5 to -1 SD	Normal bone density
Between -1 and -2.5	Osteopenia (low bone density)
Below -2.5	Osteoporosis

2 Wical and Swoope Analysis

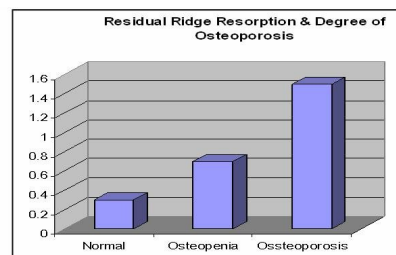
The mental foramen is recommended as a reference point for the measurement of the amount of bone loss. The distance from lower border of the mandible to the lower level of the mental foramen is measured (x) and $3x$ is considered as the actual ridge height. The distance from the lower border of the mandible to the crest of the ridge is measured (y), which is the present ridge

Observations

[Table/Fig 4] & [Table/Fig 5]



(Table/Fig 4) Relationship of degree of severity of systemic osteoporosis & sex of patient



(Table/Fig 5) Relationship of degree of severity of systemic osteoporosis & Residual Ridge Resorption

Statistical analysis was carried out using ANOVA & Unpaired t Test.

Inference

1. Residual ridge height in women was lower than that in men, with statistical significance at the 0.01 level ($p=0.0063$)
2. With ageing RRR increased the co-relation coefficient was 0.42 which was statistically significant (at 0.01 level).
3. RRR increased according to the severity of the osteoporosis. The co-relationship coefficient was 0.34 between the degree of osteoporosis and RRR, which was statistically significant at a 0.01 level.
4. Osteoporosis is more common in females, while osteopaenia is more common in males.
5. Dietary Ca Intake in all the patients was below 1000 DU.
6. There was lack of awareness also regarding the need of Ca intake.

Conclusion

Residual ridge resorption is directly proportional to the age of the patient and to the degree of osteoporosis, inversely proportional to dietary Ca intake and is more common in females.

Clinical Implication

In patients whose edentulous residual ridges are lower, osteoporosis should be considered, especially in women. In patients

with osteoporosis, rapid reduction of the residual ridge is predicted, as compared to normal patients. Massler (1979) has reported that Prosthodontists are in a strategic position to intercept the early evidence of osteoporosis and to educate the geriatric patient towards good nutrition. Thus, without assessing the osteoporotic levels of the patients if one intervenes in the fabrication of the complete denture, there are high chances of denture failure due to ridge resorption.

Further investigations with a larger sample size, is currently underway in our department.

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