

Osteoporosis: A silent disease affecting edentulous patients at an alarming rate

Rajeev Gupta¹, Archana Nagpal², Surbhi Abrol^{3,*}, Yamini Ruthwal⁴, Mamata Mahajan⁵

^{1,2}Professor, ^{3,4}PG Student, ⁵Senior Lecturer, Dept. of Prosthodontics, HDC, Surendernagar, Himachal Pradesh

***Corresponding Author:**

Email: drsurbhi.abrol90@gmail.com

Abstract

Osteoporosis has evolved as the major bone disease characterized by weak and fracture prone bones. Osteoporosis is a “silent disease” because bone eventually becomes porous, brittle and thus making it abnormally vulnerable to fracture even under minor jolt, otherwise asymptomatic. It is commonly seen in 3rd and 4th decade of life. Women are four times more affected than men. When comparing to healthy normal patient osteoporotic patients tend to have more discomfort with their existing dentures. Therefore, a well-balanced diet including vitamin D and calcium supplements with regular physical exercise is advised.

Introduction

Osteoporosis is one of the major global health problems, WHO estimated more than 200 million cases. Osteoporosis is a debilitating and progressive systemic bone pathology characterized by micro-architectural degeneration of cancellous bone density and consequent increase in risk of fracture.⁽¹⁾ Deterioration in alveolar bone height have been correlated with changes in bone tissue. Osteoporosis is a systemic disease that primarily affects post-menopausal women but can also affect older men. Epidemiological facts indicate that around 65% of Indians aged 50 and above are affected by osteoporosis, out of which approximately 80% are women.⁽²⁾

Pathophysiology

The morbidity in osteoporosis exists mainly due to associated fractures. Bone resorption occurs to larger extent than bone formation, accompanied by increase risk of fracture.⁽¹⁾ This disorder begins to manifest clinically during 4th and 5th decades of life. Until recently, osteoporosis was an under recognized disease and considered to be one of the inevitable consequence of aging. However, several studies have shown role of estrogen on development of osteoporosis. Following menopause in females bone loss occurs because of estrogen deficiency. Fall in level of estrogen may increase bone loss by stimulating several inflammatory cytokines that regulate generation of osteoclast such as interleukin 1 (IL-1), IL-2, IL- 6 and prostaglandin E2. In case of men, factors responsible for increased risk of osteoporosis are glucocorticoids treatment, excessive alcohol intake, use of anticonvulsants and hypogonadism.^(1,3)

Clinical Features: Patients are usually asymptomatic because in this disease there is marked bone loss progressing painlessly until it comes to light only due to a fall or injury presenting as fracture.

Systemic Manifestations

- Hip and Vertebral fractures: Fractures after minor trauma may be the first indication

- Patient complains of occasional joint stiffness, pain and weakness.

Dental Manifestation

- Cortex at mandibular angle gets resorbed and becomes thinner and in maxilla it becomes insignificant in alveolar crest.

Radiographic Examination: Diagnostic cornerstone for osteoporosis by far remains the measurement of Bone Mineral Density (BMD). For screening of osteoporotic patient radiographs play very important role. However, simple X rays may not be very accurate to predict osteoporotic bone in initial stages of disease.

Osteoporosis Diagnosis

1. **DEXA:** This is basically a type of bone density scan which uses low dose X rays to screen an area in the body for sign of mineral loss or bone thinning.
2. **P- DEXA:** This is a portable device which measures bone density in peripheral sites like limbs. The results are shown quicker than DEXA. The disadvantage is inability to monitor treatment of osteoporosis.⁴
3. **FRAX:** FRAX was developed by WHO. It is the latest technology that helps in 10 year probability of hip fracture takes in account BMD with clinical risk factors involved.
4. **TBS (Trabecular bone score):** It is an FDA approved technique which is available on some densitometers. It helps by measuring the micro architectural structure of bone tissue hence improving the ability to predict risk of fracture.
5. **Quantitative Computed Tomography (QCT):** This is special type of spine CT which helps to spot loss of bone mineral density. It does not measure the BMD directly but rather utilizes speed of sound with ultrasound attenuation.
6. **Spine Computed Tomography Scan:** This diagnostic tool shows demineralization. It's a type of quantitative computed tomography that can evaluate bone density. Only disadvantage with this

type of scan is its less availability and high cost as compared to DEXA.⁽⁴⁾

7. Other diagnostic tools includes various marker

I. Bone resorption markers

- Telopectide
- N- telopectide (NTX)- ELISA method
- C- telopectide(NTX)- ELISA method

II. Bone Formation Markers

- Bone Alp
- Osteocalcin

WHO Criteria For Diagnosis Of Osteoporosis

Normal values of T- score are – 1.0 and above. If score is below it then it indicates osteoporosis and similarly if score is higher it indicates osteopenia.⁽⁵⁾

Management

Drug treatment for osteoporosis includes strengthening of bones thereby reducing the risk of fractures. These drugs act by slowing down the activity of cells that breakdown old bone and these are called anti-resorptive drugs and other type of drugs are called anabolic drugs which stimulate bone forming cells. Some of the drugs that frequently used are bisphosphonates (70 mg per week), alendronate (70 mg per week), risedronate. Other methods of osteoporosis management include giving selective oestrogen receptors and parathyroid hormone treatment.⁽⁵⁾

Osteoporosis in post-menopausal woman

According to WHO treatment should be rendered to postmenopausal women with vertebral fractures, those with non-vertebral fractures associated with low BMD, and those with osteoporosis. The most rigorously investigated drugs reported to reduce spinal fractures are alendronate, raloxifene, and risedronate.⁽⁶⁾ Parathyroid hormone plays role in reducing the risk of Vertebral and non-vertebral fractures will also be an interesting alternative in patients with severe osteoporosis when approved. Drugs are also available to prevent osteoporosis, and their prescription should be decided on a case-by-case basis, according to age, degree of BMD, and presence of other risk factors. HRT is the first choice of preventive treatment in early postmenopausal women with menopausal symptoms, whereas, women at distance from menopause might prefer raloxifene.⁽⁷⁾

Prosthetic Management

The main objective of prosthetic management is to reduce the stress on bone by modifying the treatment plan. It has been well established known fact that osteoporosis results in catabolic results on stomatognathic system, hence becomes tricky for prosthetic management. In removable dentures impression techniques should aim at recording with reduced stress on the bone. Another method is to use semi or non-anatomic flat teeth or teeth with narrow

buccolingual width. Patient should be advised to use soft liners and place the dentures out of mouth for atleast 10 hrs a day.⁽¹⁾ Oral manifestations of osteoporosis are more commonly seen in women than men. An osteoporotic patient is at greater risk of early tooth mobility or loss and may need new dentures more often than any healthy elderly of same age.^(7,8,9) Many randomized clinical case reports have also shown implant failure in osteoporotic patients after menopause. Some studies contraindicate the use of implants in patients with osteoporosis on the bases that the imbalance in bone metabolism directly delays or impair bone healing around the implants.

Conclusion

Osteoporosis results from an imbalance in rates of bone formation and resorption that results in loss of mineral mass. Important oral manifestations of osteoporosis that raise concern to a prosthodontics include tooth mobility, alveolar bone loss and TMJ pathology. Up-to-date knowledge of etiology, pathophysiology and appropriate diagnosis can aid the dentist in proper treatment planning and management of osteoporotic patient. While many osteoporosis prevention studies are focused on calcium, the emphasis of some of these studies has now shifted towards the importance of vitamin D and regular exercise in the management of this disease in order to maintain healthy bone strength and integrity. Daily Recommended dose for elderly patients is 700mg and regular exercise.

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