



Efficacy of bisphosphonates in the management of dental implants in elderly women: An experimental study

Dayanand Huddar ¹, Pavithra Rangarajan Seshadri ^{2*}, Akhil Shetty ³, Ashutosh Bhise ⁴, Mushir Mulla ⁵, Munaz Mulla ⁶

1.Professor; Department of Prosthodontics, Bharati Vidyapeeth Dental College and Hospital, Sangli.

2.Reader, Department of Periodontics, Ragas Dental College and Hospital, Uthandi, Chennai600119, Tamilnadu, India

3.Professor, Department of Orthodontics and Dentofacial Orthopedics, Nitte (Deemed to be university), AB Shetty Memorial Institute of Dental Sciences (ABSMIDS), Mangalore, Karnataka, India

4.Intern, Department of Prosthodontics, Bharati Vidyapeeth Dental College and Hospital, Sangli.

⁵.Assistant Professor, Department of Public Health, College of Applied Medical Sciences, Qassim University, Saudi Arabia.

⁶.Adjunct Professor, Department of Periodontics, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai, Tamilnadu, India

*Corresponding author: Dr. Pavithra Rangarajan Seshadri,

E-mail: drpavithra1985@gmail.com

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Abstract

Objectives: To investigate the effects of bisphosphonates (BP) on alveolar bone and dental implant therapy in women who have gone through menopause.

Materials and method: In the current study, twenty two postmenopausal women who had placement of at least one tooth implant within the preceding five years took part. Eleven participants were divided into 2 groups: Group i was given BP medicine for two years, while group ii received parathyroid hormone (PTH). For both groups, measurements of thickness and bone mineral density (BMD) were made.

Result: Group ii had 5% of dental implant failures, compared to 5% in group i. The BMD of cortical bone in groups i and ii was 1425 ± 114 mg/mL and 1002 ± 76 mg/mL, respectively. Both groups' cancellous and cortical bone densities were statistically significant. In contrast, cortical bone thickening was negligible.

Conclusion: The bone mineral density of the cancellous and cortical bones declined in both groups. The thickness of cortical bone increased with continuing use of BPs.

Keywords

Bisphosphonate, implant, failures, postmenopausal ladies

Introduction

Dental implants have been more and more common as a method of replacing lost teeth in recent years due to their higher success rate. Osteoporosis has been associated with decreased calcium levels as people age, and ladies are more expected to see a decrease in bone density. Ladies show decreased cortical bone and increased cancellous bone after menopause. In cases of osteoporosis, treatment with bisphosphonates (BF) is advantageous. Osteoporosis and other bone ailments are treated with a drug called BF, which also stops bone resorption.^{1,2} Participants on BP medication are extra prone to had osteonecrosis, commonly known as BPinduced osteonecrosis. BP is the cause of lamina dura and thickening of the cortical border.

1

The current study set out to find out the effects of bisphosphonates (BP) and dental implant therapy on postmenopausal women's alveolar bone.

Material and method

Twenty two postmenopausal women over 48 took part in the current prospective investigation. Every individual had a diagnosis of osteoporosis and had minimum one dental implant inserted in the preceding five years. Participants with unilateral or bilateral edentulous mandibles were considered for this research. The situation was reviewed by the ethical committee, which then approved.

Eleven patients were categorised into 2 groupings: group ii received injection teriparatide (20 mcg once day) as a parathyroid hormone derivative (PTH), and group i received medication for blood pressure (Tab Alendronate 10 mg once daily).

For every subject, a posterior edentulous mandibular region CBCT was taken. Two equivalent volumes of calcium hydroxyapatite were concurrently scanned in a phantom fitted with calibration cells in order to determine the BMDs. The cancellous and cortical bone thicknesses were measured using the programme. The process was done once a year for 5 years. Thicknesses of cortical and cancellous bone in the 2 groups were evaluated by means of the Mann Whitney test; a $p < 0.05$ was deemed considerable.

Result

Group ii had 5% of dental implant failures, compared to 5% in group i. In groups i and ii, the BMD of cortical bone was 1425 ± 114 mg/mL and 1002 ± 76 mg/mL, respectively (Table 2). Table 2 presents the group's cortical and cancellous bone density, which was statistically significant ($p < 0.05$). Compared to both groups, cortical bone thickening was negligible (Table 3).

Table 1: Association of different parameters

parameter	Group i	Group ii
Average age (in years)	61.2	62.5
Dental implants positioned	13	17
Failure cases	1 (5%)	1 (5%)

Table 2: Bone mineral density (BMD) amongst groups

Bone mineral density	Group i	Group ii	p
BMD of cortical bone (mg/mL)	1425 ± 114	1002 ± 76	0.02
BMD of cancellous bone (mg/mL)	73 ± 14	98 ± 57	0.04

Table 3: Thickness Cortical bone amongst both grouping

Groups	Group i	Group ii	p
Thickness of Cortical bone (mm)	2.3 ± 0.8	2.3 ± 0.8	0.15

Discussion

Parathyroid hormone (PTH) therapy is extensively used in the treatment of osteoporosis in men and women who have had menopause. Because a few variables can lead to implant failure therapy, patients receiving dental implants should be carefully evaluated before receiving the treatment.¹

Pandey et al. investigated the effects of bisphosphonates (BP) on alveolar bone and dental implant treatment in postmenopausal women. They concluded that there had been a

decline in the bone mineral density of both cancellous and cortical bone in both groups. The thickness of cortical bone increased with continuing use of BPs. ¹

In accordance to Carvas et al., treating rabbits with zoledronic acid thickened the cortical bone in their tibial bones.³ Yip et al. looked at the relationship between oral bisphosphonate use and dental implant failure in a research involving middle-aged ladies. They found that the survival rate for dental implants was 66.7% lower in patients using oral BPs.⁴ In accordance to Suvarna et al., people on BP medication do not have a noticeably greater risk of implant failure. ⁵ Those using BPs had a 65.3% higher chance of implant failure than those not using this class of medication, according to Sulaiman et al. ⁶ According to Koka et al., patients who use bisphosphonates and have dental implant surgery are not recommended to take a "drug holiday" from bisphosphonates because they have a low risk of developing osteonecrosis of the jaw. ⁷ Similar to our findings Manas et al found decrease in bone mineral density for both tested groups in cortical and cancellous bones. ⁸

Despite the minimal frequency of osteonecrosis linked to BF usage, the practitioner needs to consider the danger and take precautions to prevent it. Patients receiving BPs therapy should have a comprehensive clinical and radiological examination prior to obtaining dental implants. More investigation is needed to validate the results.

Conclusion

The bone mineral density of the cancellous and cortical bones declined in both groups. The thickness of cortical bone improved with continuing use of BPs.

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