Prosthetic rehabilitation of an osteoporosis case with semi precision attachments and cast partial dentures - A case report

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Received - 04 September 2019 Initial Review - 20 September 2019 Accepted - 24 September 2019

ABSTRACT

Osteoporosis is a skeletal disorder that has emerged as a major health problem affecting mostly in the postmenopausal women and older individuals. In osteoporosis, there is an imbalance between the bone formation and bone resorption where in, there is an increase in resorption. It even affects the jaw bones making a challenging task for the prosthetic rehabilitation. Here, we present a case report of prosthetic rehabilitation of an osteoporosis case of 65-year-old woman, using semi precision attachments with Cast partial dentures.

Keywords: *Bone mineral density, Cast partial dentures, Osteoporosis, Semi precision attachments.*

Osteoporosis also known as a silent disease, that affects patients who do not even understand about the nature of their disease until it develops significantly that the patients are reported with osteoporosis related fractures [1]. WHO in 1994 defines osteoporosis as 'a disease characterized by low bone mass and microarchitectural deterioration of bone tissue leading to enlarged bone fragility and consequent chances of fracture risk.' A Bone Mineral Density (BMD) test measures the bone mineral density and compares it to that of an established norm or standard to give a score. The differences between the patients BMD and that of the healthy young adult norm are measured in standard deviations (SDs).

A T-score between +1 and −1 is considered normal or healthy. A T-score between −1 and −2.5 indicates that you have low bone mass, although not low enough to be diagnosed with osteoporosis. A T-score of −2.5 or lower indicates osteoporosis. The greater the negative number, the more severe the osteoporosis. In young adults, the bone mineral density is 2.5 SD below the mean peak value [2, 3]. Data on the prevalence of osteoporosis among women in India come from studies conducted in small groups spread across the country.

The rough estimate suggests that of the 230 million Indians expected to be over the age of 50 years in 2015, 20% are osteoporotic women [4]. Prevalence of osteoporosis ranging from 8% to 62% in Indian women of different age groups has been reported by several studies [5]. Osteoporosis is more common in postmenopausal women and it causes fracture in bones due to the decline in estrogen level [6]. This article presents prosthetic rehabilitation of an osteoporosis case using semi precision attachments with cast partial dentures.

CASE REPORT

A 65-year-old female patient reported with a chief complaint of pain in left upper and lower region of the jaw and inability to

Figure 1: Preoperative Intraoral View.

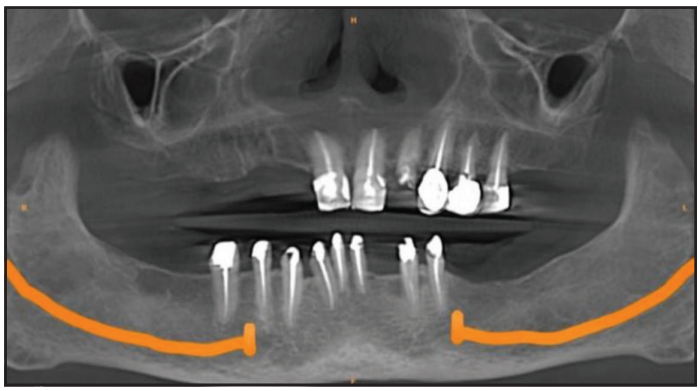

Figure 2: Preoperative OPG.

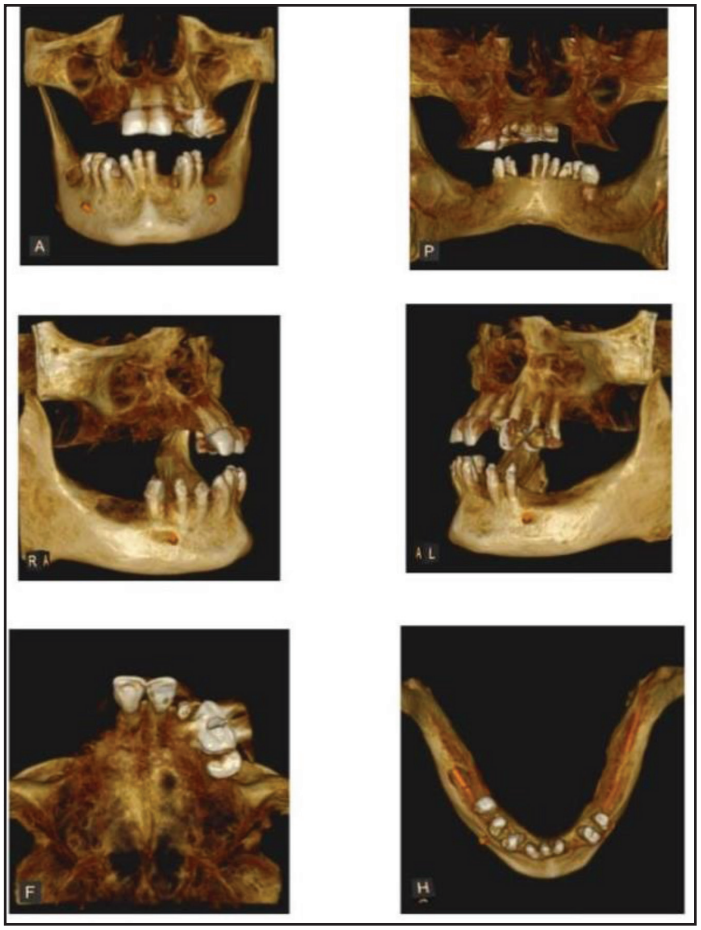

Figure 3: CBCT Scan.

chew food due to missing teeth past 2 years. Her medical history revealed that she was a known case of osteoporosis. Patient had a past dental history of extraction, root canal treatment and fixed partial denture (Fig. 1).

On examination, the teeth present were 11, 21, 22, 23, 24, 25, 31, 33, 34, 41, 42, 43, 44, 45. An Orthopantomogram was advised which revealed incompletely done root canal treatments (Fig. 2). Patient was partially edentulous past 2 years and wanted a prosthetic rehabilitation. The patient was informed with the various available treatment options.

Considering the literature on the placement of implants in osteoporosis case the patient was informed accordingly and the dental and medical investigations were carried out (Fig. 3). But the medical reports were unfavourable, the physician didn't give consent and patient was unwilling for implant procedure because of questionable prognosis. An alternative treatment was planned which involved using semi precision attachment with cast partial dentures. The patients' consent was taken after explaining the procedure and the risks involved.

Figure 4: Vertical stop as the vertical dimension for further reference.

Maxillary and Mandibular impression were made using irreversible hydrocolloid (Zhermack Tropicalgin Alginate). Denture base and occlusal rims were fabricated to record the jaw relation to maintain the vertical stop the vertical dimension for further reference (Fig. 4). Root canal was again carried out with all the required teeth and extraction of the tooth with poor prognosis.

Tooth preparation was done, maxillary and mandibular impression wase made using elastomeric impression material (3M ESPE Putty) followed by facebow transfer and mounted on semi adjustable articulator (Fig. 5). The semi precision attachment used was Rhein'83 in the fabrication of the prosthesis. The attachments were luted using ZOE temporary cement (Dentsply Intermediate Restorative Material) and were picked up with elastomeric impression material (3M ESPE Putty). The obtained impression was then poured using Type IV Gypsum product (Fig. 6).

Wax trial and Bisque trial was done, heat cure acrylization was carried out (Fig. 7).The attachment prostheses were then cemented in patients mouth using Type I GIC (GC luting cement) and the cast partial denture was inserted in the patient's mouth (Fig. 8). Fig. 9 shows the intra oral view of right and left lateral while Fig. 10 shows the pre and post-operative smile of the patient. A 6 months and 11 months follow up was done (Fig. 11).

Figure 5: Tooth preparation followed by facebow transfer.

Figure 6: Cast obtained after pick up impression.

Figure 7: The Definitive Prosthesis.

Figure 8: Prosthesis Inserted.

DISCUSSION

Osteoporosis is classified as primary osteoporosis of unknown cause and secondary osteoporosis which has a traceable etiology. Primary osteoporosis is further classified as Type - I Post-menopausal (between 50-70 years of age) and Type - II Age related (more than 70 years of age) [7]. Osteoporosis is also classified as localized and generalized osteoporosis. The generalized can be either primary or secondary [8]. Osteoporosis also affects the jaw bones resulting bone loss [9]. Older patients with osteoporosis are at an increased risk for tooth loss. Taguchi et al suggested that the loss of posterior teeth may be associated with reduction in alveolar bone height and in alveolar BMD [10].

There are various treatment options described in literature for prosthetic management of an osteoporosis case, the use of dental implants in such cases have proved that it's not a contraindication in osteoporosis [11]. On that basis, prosthetic rehabilitation using dental implants was our first choice for the treatment. The patient was advised for Cone Beam Computed Tomography scans for implant placement but the medical reports were not so favourable so the patient did not consent for implant procedure as the prognosis was also questionable [12].

Removable partial denture if considered as a treatment options in a10-year longitudinal study carried out on 27 patients in which removable partial dentures (RPDs) were fabricated showed that no significant deterioration of the periodontal status of the remaining teeth [13]. Another 10-year retrospective study carried out on 72 patients showed the success rate of clasp retained removable partial dentures determined a 36.6% success rate, 23.8% partial success rate and 39.6% were failures rate [14].

In osteoporosis the rate of ridge resorption is more as compared to a healthy individual so the treatment plan involved was to preserve the existing amount of bone possible by preservation of teeth. In such cases when implants are contraindicated, semi precision attachments serve a better treatment of choice [15]. They help in stress distribution and preserving the alveolar ridge.

A conventional complete denture or a tooth supported over denture was not a treatment of choice as that would involve the total or partial extraction of teeth resulting in alveolar bone loss [16]. A conventional removable partial would not provide

Figure 9: Right and left lateral view.

Figure 10: Postoperative patients smile.

Figure 11: After 11 months follow up.

similar retention and stability as compared to semi precision attachments.

A similar treatment approach was carried out in an osteoporosis case using removal of the fixed dental bridge in the lower jaw and replacement with RPDs specially fixed on OT-CAP® systems united by a rigid Dolder bar and convectional dental crown and dental bridges [17]. The control over osteoporosis could be with regular physical activity, balanced dietary intake of calcium and vitamin D. with the supplements of calcitonin, anabolic steroids, parathormone, fluoride, estrogen and bisphosphonates therapy [18].

CONCLUSION

This treatment option of using Rhein '83 attachment along with the cast partial dentures provided proper stability, support and retention with optimal aesthetics along with preservation of supporting structures.

ACKNOWLEDGEMENT

I would Like to acknowledge Mr. Senthil Kumar, Chief Dental Technician at Innovative Lab Solutions, Chennai for lab support

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Funding: None; Conflict of Interest: None Stated.

How to cite this article: Deshpande VA, Kothadia SN, Kothadia NG, Deshpande RV. Prosthetic rehabilitation of an osteoporosis case with semi precision attachments and cast partial dentures - a case report. Indian J Case Reports. 2019;5(5):464-467.

Doi: 10.32677/IJCR.2019.v05.i05.021