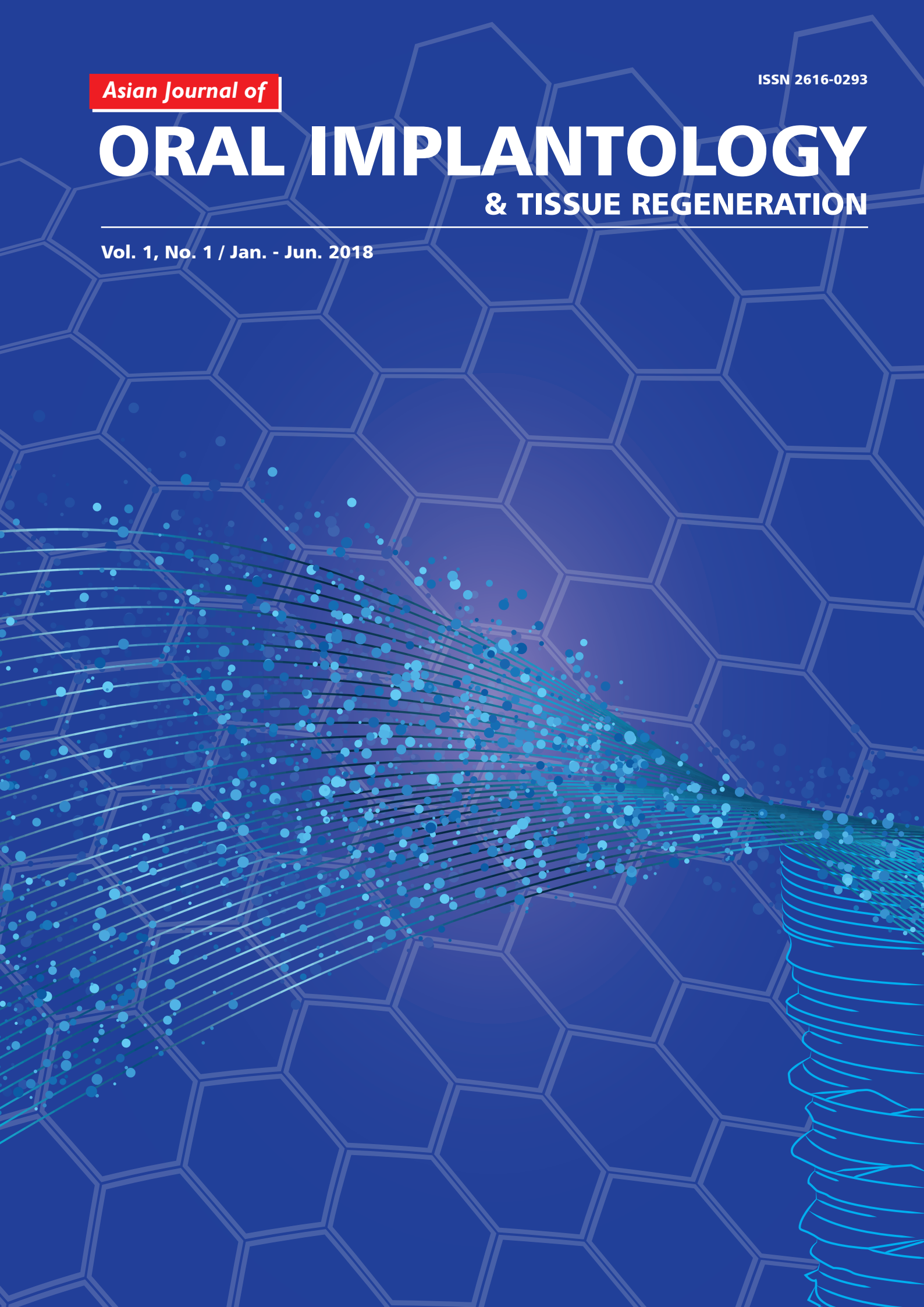


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# Horizontal and vertical ridge augmentation in the aesthetic zone

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## Introduction

A long standing edentulous space results in bone resorption, creating a bony defect jeopardizing implant placement. For the very same reason, various bone grafts are available which improve the quality of bone for implant placement. There are 4 types of grafts, autograft, harvested from the patient itself, allografts, harvested from same species, xenografts, harvested from different species and alloplasts, which are synthetic bone grafts. Autograft is the gold standard, for the rest of the graft types, apart from being osteoconductive each has specific quality to be used depending upon case to case.

Allografts, though one of the most commonly used grafts which provide an osteoconductive surface along with source of osteoinductive factors,<sup>1</sup> have disadvantages as regenerative properties depend upon donor variability limiting the predictability as an osteoinductive material<sup>2</sup> as the bone inducing ability is age dependent, thus older donors are less likely to have strong bone-inducing activity.<sup>3</sup> Also, demineralization of the graft varies between tissue banks which may affect clinical regeneration. Keeping

all these factors into consideration, bovine Xenograft which is identical to human bone has gained popularity. One such material which has shown promising results in the field of bone regeneration is bovine Xenograft (BDX) Ti-oss.

## Case report

A patient reported with long standing edentulous space in relation to 21 and bone loss upto one-third of the apical portion in 22 (Fig 1). An artificial crown in relation to 21 was supported with the help composite and wire splint (Fig 1). Patient lost 21 to trauma few years ago and was willing for implant placement. Patient was healthy without any medical condition or drug allergies.

Clinically defect was classified as a C.2.e type (Fig 2) according to cologne classification.<sup>4</sup> Defect was grafted with Ti-oss bone graft and Titanium reinforced Cytoplast membrane. (Immediate implants, Nobel Active 4.3/11.5 in 21 and 3.5/11.5 in 22 were placed (Fig 3). Implants were loaded after 5 months (Fig 4). Post-op one year follow up showed excellent hard and soft tissue configuration around implants without any complications (Fig 5).



Fig. 1

**Fig. 1** Pre-operative clinical image

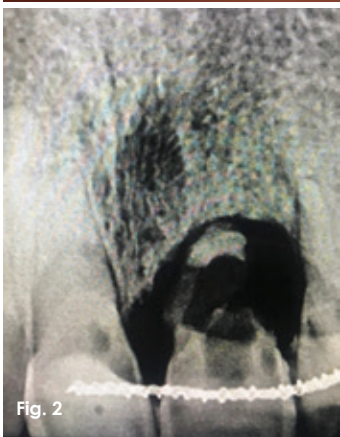


Fig. 2

**Fig. 2** splinted crown and bony defect



Fig. 3

**Fig. 3** C.2.e Defect type

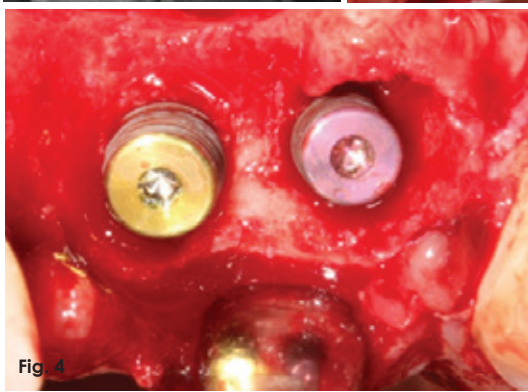


Fig. 4

**Fig. 4** Clinical images of implant placed



Fig 5

**Fig. 5** Bone graft used

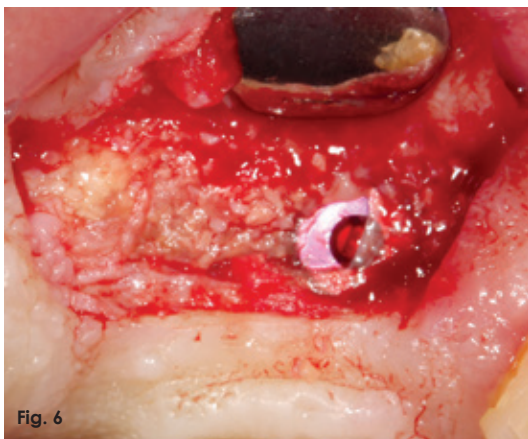


Fig. 6

**Fig. 6** At membrane removal

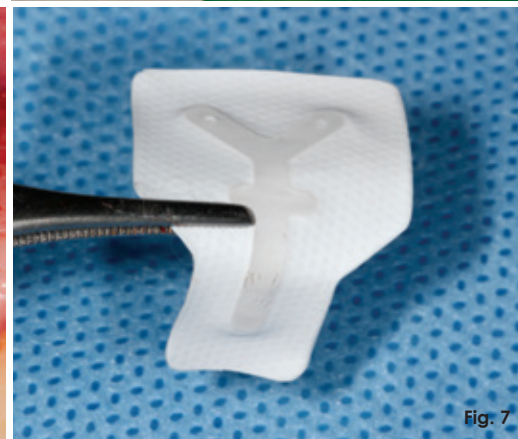


Fig. 7

**Fig. 7** Ti re enforced cytoplast membrane

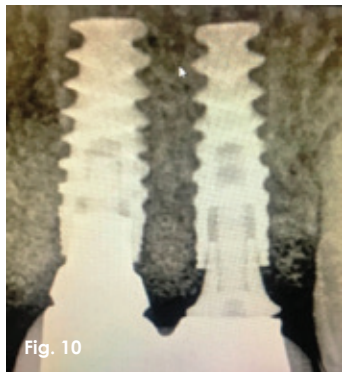
**Fig. 8** Radiographic images of implant placed



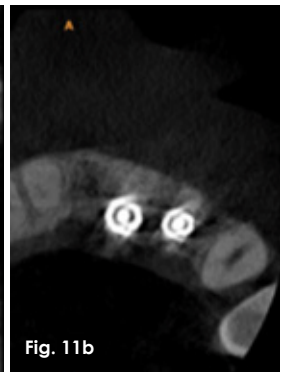
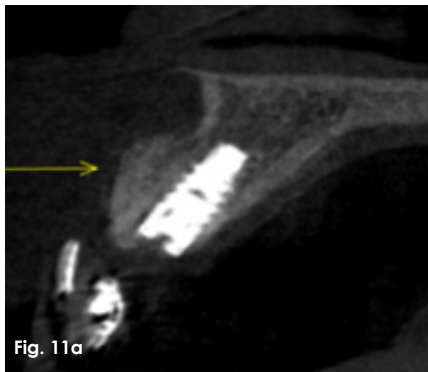
**Fig. 9** Implant loading at 5 months



**Fig. 10** Post-op 1 year follow up



**Fig. 11a, 11b** Post-op CBCT



**Discussion**

As a forementioned there are various types of grafts available each having distinct properties. Out of all, autogenous remains as the gold standard but grafts types such as allografts are also being used most commonly due to their BMP releasing ability.<sup>2</sup> However, because of their disadvantages, a clinician is not certain of their regenerative properties. Thus, to overcome these drawbacks, Xenografts have become a popular choice.

BDX is considered identical to the human bone.<sup>5,6</sup> And has several characteristics and advantages when compared with freeze-dried demineralized bone such as, no donor site is required from the patients, age dependent regenerative capacity is no longer a disadvantage, unlimited supplies of the material are available; the material can be easily handled and has predictable results.<sup>7</sup> Other advantages are that it is 100% deproteinated and crystalline hydroxyapatite grafting material which is considered biocompatible<sup>7</sup> and is very well tolerated, and without any adverse reactions or allergies reported so far.

Several studies have shown that DBX has excellent osteoconductive properties facilitates angiogenesis and migration of osteo-

blasts.<sup>8-11</sup> Various histological studies have also shown that with time BDX particles were surrounded by mature, compact bone and in some Haversian canals, it was possible to observe small capillaries, mesenchymal cells and osteoblasts in conjunction with new bone and the BDX granules being interconnected by bridges of vital newly formed bone.<sup>12</sup> With time, BDX becomes integrated and subsequently replaced by newly formed bone.<sup>6</sup> It has been reported that BDX in spite of having a very low resorption rate<sup>13</sup> it has shown enhanced osteoblast activity to promote bone formation. Because of its these properties it can be used for ridge augmentations and also with immediate implants.

**Conclusion:**

Xenograft Ti-oss bone graft material shows good results and can be used in large defects without any complications. Immediate implants can also be placed along with the bone graft which and results shows excellent hard and soft tissue healing around implants.

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