# Xenografts and religious beliefs

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## CASE SCENARIO

A 24-year old Hindu female presented with missing central incisors and grossly decayed lateral incisors. Her options were varied - to have a fixed partial denture, removable partial denture, or an implant supported prosthesis/prostheses. From the initial consultation, she decided that once the teeth were extracted she would prefer dental implant placement. She did not want a partial denture because she felt she might have difficulty with self maintenance and was not confident with the aesthetics it might offer. She specifically wanted independent tooth replacement.

Upon extraction of the lateral incisors, a full thickness flap was elevated, revealing an anterior maxillary ridge too deficient in bone to accommodate the planned dental implants. It was explained to the patient that bone was lacking in the area and that an additional augmentation procedure would be required. This would entail a bone block harvested from her ramus, fixed in place at the implant site and packed with bone particulate. The patient, though hesitant to have additional and extensive surgery, felt obliged to continue on the clinician's recommendation. The bone block was fixed in place and bone particulate, harvested from the patient's upper jaw, was combined with bovine bone particulate and packed between the block and placed implants. A membrane of porcine pericardium stabilised the graft, the wound was closed and the patient left to heal for a period of 8 months. She was not informed about the fact that some of the components of the graft were of animal origin.

## BACKGROUND

There is societal expectation that procedures with greater risks are administered only by competent individuals, with appropriate levels of technical expertise and training. There is also an expectation that practitioners should provide patients with meaningful information to obtain informed consent. It is expected that they will assess the suitability of patients for procedures which may carry health risks.[1]

Extraction socket wound healing is characterised by resorption and remodeling of the alveolar bone at the extraction site. This produces a decrease in ridge volume, deformations in ridge contour, and thus, difficulties for subsequent prosthetically-driven implant placement in the ideal position.[2] Ridge preservation is the use of grafts and/or membranes to try to minimise the loss of the alveolar ridge after tooth extraction. Extraction sockets are typically filled with autogenous, allogenic and alloplastic materials. Membranes or soft tissue are used to contain the graft. More recently, biodegradable sponges and materials coated in growth factors have been proposed. Irrespective of method or materials, there seems to be some maintenance of the alveolus. Bone fill seems to occur in preserved extraction sockets, in most cases with a high percentage of residual graft particles.[3]

With the variety of bone grafting materials used in these ridge preservation techniques, clinicians need to understand not only basic bone biology, but also the origin and characteristics of different bone grafting materials, to make proper clinical decisions when selecting a material for alveolar bone augmentation and implant treatment.

While the need for bone grafting has been significantly reduced, it has not been eliminated entirely. Furthermore, while bone grafting of earlier years involved harvesting and using large quantities of the patient's own bone (autogenous grafts), materials today, such as anorganic bovine bone derived mineral (cow), bovine pericardium membranes (cow), porcine collagen and pericardium membranes (pig), are often used.[4-6] The bone material of the xenografts are generally comprised of only the mineral content of natural bone harvested from healthy animals, that has been sterilized and typically had all organic content removed. Using bovine bone (cow) as a graft material has become commonplace in oral surgery and implantology, and has been a tried and proven technique for some years.[7] Essentially, the bovine bone graft is placed to act as a "biological placeholder." In ridge preservation, the graft provides initial mechanical support and prevents the collapse of the surrounding ridge tissues. Similarly, in guided bone regeneration techniques (GBR), bone graft material provides the scaffolding for new bone formation to augment a deficient ridge.[8] Cancellous porous bovine bone mineral (PBBM), applied to fresh extraction sockets, has recently been proposed to minimise the reduction in ridge volume. PBBM particles are an appropriate bio-compatible bone derivative in fresh extraction sockets for ridge preservation.[9] Homogeneous demineralized, freeze-dried bone from sheep (s-DFDB), or heterogeneous demineralized, freeze-dried human bone (h-DFDB), as grafting material in sinus augmentation procedures, has also been described.[10]

## ETHICAL CONSIDERATIONS

Widespread growth in esthetic and implant dentistry in their application is being experienced. Treatment often involves tissue grafting with autografts, allografts, and/or xenografts. With the growing use of these techniques and the variety of xenograft materials in dentistry, the ethical considerations for multi-cultural, multi-religious patient populations need to be highlighted. In the abovementioned scenario, there is a dilemma regarding the use of an autograft versus a bovine xenograft. The growing use of ridge preservation techniques, using animal graft materials, has raised many ethical, moral and societal issues. Religious affiliations may play a part in the decision-making of some individuals, with regard to the use of animal products and materials in their treatment.
Informed consent is an individual's autonomous authorisation of clinical intervention or treatment.[11] A person must do more

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than express agreement or comply with a procedure. He or she must authorise something through an act of informed and voluntary consent. The ethical principle of autonomy refers to the right of every individual to make decisions for him/herself. In the dental setting, this means allowing the patient to make the final decision regarding his/her treatment, after having been provided with all necessary and relevant information.

Before subjecting a patient to any treatment, we need to obtain their informed consent and this is both an ethical and a legal requirement. Consent must be voluntary – that is – the patient must not be manipulated or coerced into consenting. Once this requirement is satisfied, it is essential that the patient is given all the relevant information, related to the procedure or treatment in a language that is easily understandable. Effective, two way communication between a patient and the healthcare professional is essential to obtaining valid consent.[12]

According to the National Health Act of No 61 of 2003, Chapter 2 Section 6 the following information must be given to the patient (User of Health Care Service):[13]

- Range of diagnostic procedures and treatment options available.
- Benefits, risks, costs and consequences associated with each option.
- User's right to refuse care after having received explanations of the implications, risks and obligations of such refusal.
- Furthermore, this information must be provided in a language that the patient understands and in a manner that takes into account the patient's literacy level.

Once patients have processed the relevant information they will then make the decision either to authorise the intervention or decline the procedure/treatment. They can also withdraw consent at any time. The dental professional's recommendation is also important. This is especially relevant for South Africa where the concept of autonomy is not fully developed and where patients still place high value on the advice from their health care professionals. Therefore in advising patients, it is essential to always be motivated by the patient's best interests.[11] However, equally important is for the health professional to be empathetic to the religious and/or multi-cultural societies patients come from.

The final decision will be dependent on a review of the treatment options which had been clearly explained, in an even-handed, unbiased manner, together with consideration of the risks and benefits of the procedures. Evidence-based clinical decision making combines the best currently available literature with the clinician's experience and skills and incorporates explicitly the patient's preference in terms of real and perceived risks, benefits, and desires.[14]

The principle of beneficence refers to doing good and acting in the patient's best interests. All dentists have the responsibility to provide beneficial treatment, to benefit patients by not inflicting harm, by preventing and removing harm. The "best interest" of patients means that professional decisions of proposed treatments and any reasonable alternatives proposed by the dentist, must consider patients' values and personal preferences. In addition, patients must be informed of possible complications, alternative treatments, advantages and disadvantages of each, costs of each and expected outcomes. Together, the risks, benefits, and burdens can be balanced. It is only after such consideration that the "best interests" of patients can be assured.[12]

## CONCLUDING REMARKS

Often scant, or no attention is paid to the specificity of consent, with regard to the widely growing use of ridge preservation techniques and graft materials, as well as their ethical implications. If not properly considered, there is a risk of psychological harm and social prejudices, which may ultimately affect the rights and freedoms of the participant and his or her family. The use of specific materials must be expressed and integrated into consent forms. Modified consent forms have been designed to provide for all scenarios, from the most general and open-ended approach to the complex technical, legal and protectionist approaches. However, ethical principles concerning individual rights and familial and societal obligations, are often absent. Regardless of which materials will be used in the intervention, all consent forms related to graft materials, should respect three basic principles: those of individuality, confidentiality and freedom of choice.[15]

In view of the above, it would be prudent for clinicians to revise their informed consent forms for patients undergoing procedures which incorporate the use of grafting materials in the maxillofacial region. The revision should accommodate patient rights with regards to their religious affiliations so as to avoid any ethical, legal, and social repercussions which may consequently arise in the provision of care. The moral and ethical guidelines of society must be respected, as well as ensuring there will be minimal risk to the recipient - including transgression of cultural and religious tenets. Finally, clinicians must always respect and consider the best interest of the patient and honour the ethical, moral and religious values of society at all times.

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