Title: Knowledge and practice of 'Bone grafts used in oral implantology' in kurla Mumbai. Maharashtra,India . A questionnaire-based study.

Dr. Abdullah Shaikh[1], Dr. Arti Gangurde[2], Dr. Manish Chauhan[3], Dr. Niraja Jaiswal[4]

Abstract:

In the evolving landscape of oral implantology, the integration of bone grafting techniques has become pivotal in enhancing implant success and functionality. Bone grafts, utilized to address deficiencies in alveolar bone, have revolutionized the field by providing the necessary scaffolding for osseointegration and long-term stability of dental implants. This abstract explores the diverse types of bone graft materials, including autografts, allografts, xenografts, and synthetic substitutes, and their respective roles in promoting optimal bone regeneration. Emphasis is placed on the interplay between graft material properties and patient-specific factors such as bone quality, defect size, and systemic health. Additionally, emerging advances in grafting technology, such as bioactive coatings and growth factor-enriched materials, are examined for their potential to further enhance graft performance and integration. By elucidating these elements, this overview underscores the transformative impact of bone grafting on implant success rates and overall patient outcomes, paving the way for future innovations in oral reconstructive therapies.

Objectives:

The objective of this study is to assess the level of knowledge and the current practices related to the use of bone grafts in oral implantology among dentists. Specifically, the study aims to:

1. Evaluate the depth of understanding among dentists regarding different types of bone graft materials, their indications, and their respective advantages and limitations.
2. Analyze the prevalence and methods of bone graft utilization in clinical practice, including the selection criteria and procedural techniques employed.
3. Identify gaps in knowledge and areas for improvement in the application of bone grafts within oral implantology.
4. Explore the impact of continuing education and professional experience on the proficiency and confidence of dentists in using bone grafts for implant procedures.

By achieving these objectives, the study seeks to provide insights into the current state of bone graft utilization in dental implant practices and to recommend strategies for enhancing knowledge and practice in this critical area of oral surgery.

Materials and Methods

1. Study Design

This study employs a cross-sectional survey design to assess the knowledge and practices of bone graft use in oral implantology among dentists. The research is conducted through a combination of online questionnaires and follow-up interviews.

2. Participants

A sample of 197 dentists is selected using stratified random sampling from a national dental registry.

Study Population:

The study population consisted of practicing 200 dentists in Kurla, Mumbai, including both general dentists (BDS) and specialists (MDS).

Sample size was determined using the estimates of mean and standard deviation values from literature using the Formula: n= (〖Z1〗^2 {P(1-P))/d^2

where Zα is 1.96 i.e., Z variate of alpha error (for 95% confidence level), and P stands for the prevalence, assuming the present knowledge level to be 50%, d is the Desired level of absolute precision.

The sample size was calculated to be 197

Pilot Testing:

- The questionnaire is pilot-tested with a sample of 10 dentists to ensure clarity, reliability, and validity. Adjustments are made based on feedback.

3. Data Collection

a. Survey Development:

- An initial literature review is conducted to identify key areas of interest, including types of bone graft materials, indications for use, and procedural techniques.
- A structured questionnaire is designed, consisting of both closed and open-ended questions. The questionnaire covers:
    - Demographic information (e.g., years of practice)
    - Knowledge of bone graft materials (e.g., autografts, allografts, xenografts, synthetic materials)
    - Clinical practices (e.g., frequency of use, technique preferences, complication rates)

b. Data Collection Process:

- The finalized questionnaire is distributed electronically via email and online survey platforms. Dentists are given a 3-week period to complete the survey
- **Statistical procedure:**

Data Analysis:

Descriptive Statistics:

- Demographics: frequencies and percentages are calculated for demographic variables such as years of practice, type of practice, and geographic location.
- Knowledge Assessment: Mean scores and standard deviations are computed for responses related to knowledge of bone graft materials and techniques.

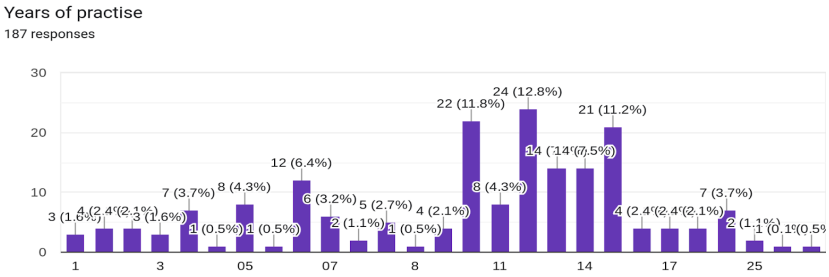
- Practice Patterns: Descriptive statistics (e.g., frequency distributions) are used to summarize data on the use of different types of bone grafts, procedural techniques, and complications rates.

Inferential Statistics:

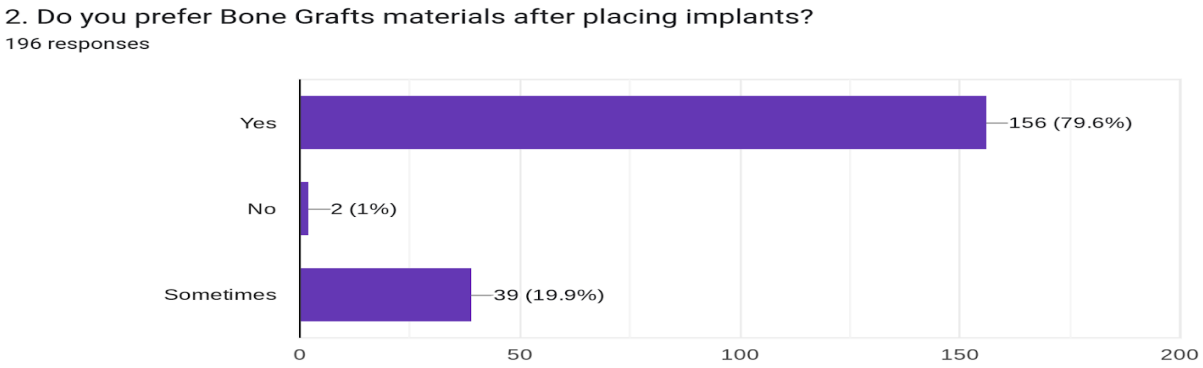
- **Chi-Square Tests:** Used to determine if there are significant associations between categorical variables, such as the type of practice and the frequency of bone graft use. P value was deemed as staticially significant, it was ≤ 0.05. The confidence interval was found to be 95%.
- The finalized data obtained from the survey was entered into the Microsoft Excel sheet and analysis was obtained. The following results include bar diagram, charts, histograms.

RESULTS:

The survey received a total of 197 responses. The majority of dentists practice oral implantology, which was around 98%. Out of total 197 participants, the majority of respondents are in the 30-39 and 40-49 age groups, with very few older participants. Out of 197 participants, a total of 112 falls in the age group of 30-39 years. While there were only 2% of participants who do not practise oral implantology.



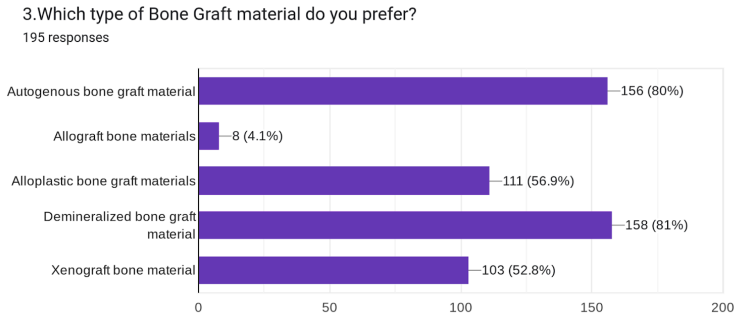
The majority of participants use bone graft materials (about 79.6%), depending on specific cases. A smaller proportion consistently prefer using bone graft materials sometimes depending upon the case which was around 19.9% while only 2% of participants they do nt use bone grafts.



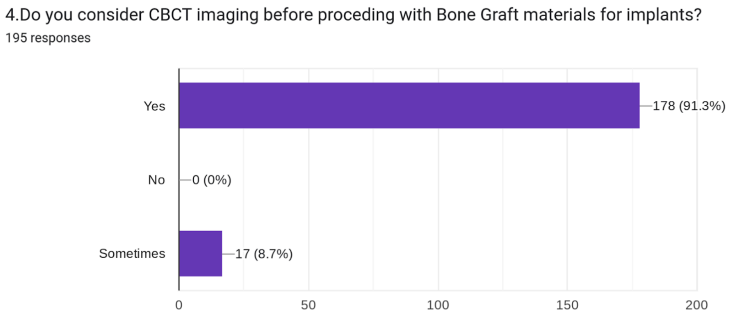
Autogenous bone graft material is the most preferred accounts for 80% in the survey, valued for its biocompatibility and osteogenic potential.

Alloplastic and Allograft materials are also favored, possibly due to availability and reduced morbidity.

Some practitioners opt for a combination including **DFDBA (Demineralized Freeze-Dried Bone Allograft)**, indicating a preference for diverse options based on case requirements.The use of DFDBA was found to be approximately 81% followed by alloplastic (56.9%) followed by xenograft which accounted for 52.8%.



Approximately 91.3% of population utilize **CBCT (Cone Beam Computed Tomography)** imaging prior to bone graft procedures, underscoring its importance in pre-surgical assessment for accurate diagnosis and treatment planning.



A significant number use **TCP with hydroxyapatite (12%)** selectively, suggesting reliance on synthetic alternatives when suitable.

Some consistently prefer these materials, possibly due to factors like ease of use and patient-specific considerations.

A majority of 67.3% do not use these alternatives, potentially favoring natural graft materials exclusively.

Majority opt for **bone grafting** to augment bone height before implant placement, aiming for optimal implant stability and longevity.

A considerable proportion proceed directly with **short implants**, indicating confidence in modern implant designs and techniques to function effectively even with limited bone height.

About 99% of the participants prefer Intra-oral sites to obtain bone grafts while only 1% of population relies on extra-oral sites.

Approximately 90.8% of the particpants prefer extraction sockets to obtain bone grafts followed by Maxillary tuberosity region (82.1%) followed by buccal shelf area (84.7%) while only 57.1% of participants uses autogenous tooth to obtain the bone grafts from Inta-oral sites.

A majority of participants about 54.6% thinks that Bio-oss bone graft material not to be an effective alternative to the Autogenous bone graft material, while only 6% found to be effective.

Majority of participants of approximately 93.4% opts for delayed implant placement while only 9.7% opts for immediate implant placent after bone grafts application. A majority of 79.1% waits for a period of 5-6 months after placement of bone grafts while 48% of participants waits for 3-4 months for implant placement. Approximately 90.8% of participants implant have failed to osseointegrate which was found to be very surprising.

About 75% of participants practising oral implantology do not prefer mix PRP with bone graft material, also about 94.9% of participants do not use the composite bone bone grafts in oral implantology.

Approximately about 78.6% opts for going with non resorbable high density PTEE membrane after placement of bone graft material. About 45% of dentist prefer to mix the bone grafts with Antibiotics which includes amoxycillin and clavulinic acid (95.7%) while only 23% of participants opts for clindamycin.

A clinical senario was presented to the participants ‘ Crestal height is 4 mm do you still consider bone graft material or proceed with short implants?’ about 95.9% of participants opted for bone graft material while only 14.3% opted for short implants.

About 89.7% of dentist participating in the survey do not proceed for implantology with bone grafts in osteoporosis case with very limited bone volume while only 5.6% opts to proceed with bone grafts and implants in such case.

DISCUSSION: Bone grafting plays a crucial role in oral implantology, particularly for addressing deficiencies in alveolar bone, which is vital for successful dental implants. The various types of bone graft materials, including **autografts, allografts, xenografts, and synthetic substitutes**, each have unique properties that influence their selection and application in clinical practice.

Types of Bone Graft Materials and Preferences

- **Autografts** are the most preferred, accounting for 80% of the cases, primarily due to their biocompatibility and osteogenic potential.
- **Alloplastic** and **allograft** materials are also favored by some practitioners, possibly due to their availability and the reduced morbidity associated with their use.
- Some dentists use combinations, like **DFDBA (Demineralized Freeze-Dried Bone Allograft)**, indicating a preference for diverse options tailored to specific case requirements.

Imaging Techniques and Grafting Approaches

The study emphasizes the significance of pre-surgical assessments, with **91.3% of dentists using CBCT (Cone Beam Computed Tomography)** before bone graft procedures. This highlights the importance of accurate diagnosis and treatment planning in achieving successful outcomes.

Use of Graft Materials and Techniques

- A substantial proportion of practitioners prefer bone grafting to augment bone height before implant placement, aiming for optimal implant stability and longevity.
- A smaller proportion proceed directly with short implants, indicating confidence in modern implant designs that can function effectively even with limited bone height.
- The majority of participants favor **intraoral sites** for obtaining bone grafts, particularly from extraction sockets and the maxillary tuberosity region.

Challenges and Variations in Practice

- The study reveals some challenges and variations in practice, particularly concerning the use of **Bio-Oss** as an alternative to autogenous bone graft material. While a majority of 54.6% do not consider it an effective alternative, a small percentage (6%) do.
- Most participants prefer to delay implant placement after bone grafts, with 79.1% waiting for 5-6 months before proceeding.

Attitudes Toward Complex Cases and Advanced Techniques

- **Osteoporosis Cases**: Most dentists avoid proceeding with implants and bone grafts in cases with severe bone loss due to osteoporosis, with only 5.6% willing to take on such cases.
- **Advanced Materials**: There is limited use of advanced materials such as non-resorbable high-density PTFE membranes and the mixing of grafts with PRP or antibiotics, indicating selective use of these techniques based on specific case requirements.

Conclusion and Implications for Practice

The study concludes that while a significant portion of practitioners actively use bone graft materials, there is a selective approach based on individual case requirements. Autogenous grafts remain the most preferred, and CBCT imaging is widely utilized for precision in treatment planning. However, there is variability in the use of alternative materials and techniques, reflecting a cautious approach to more complex cases like those involving osteoporosis.

This study underscores the need for continuous education and the sharing of best practices to enhance the knowledge and application of bone grafts in oral implantology, ultimately leading to improved patient outcomes.

REFERENCES:

1-"Bone Grafting for Dental Implants: A Comprehensive Review" in the *Journal of Periodontology*.

2-"Bone Grafting in Oral Implantology" by J. A. Schilling and R. L. Greenfield.

3-"Guided Bone Regeneration and Bone Grafting Techniques" by M. G. P. Leite and R. S. L. de Souza.

4-The Role of Bone Grafting in Implant Dentistry" by S. P. Nair.

5-Bone Regeneration Techniques in Implant Dentistry: A Literature Review" in the *Journal of Clinical Dentistry.*

6-Comparative Study of Different Bone Grafting Materials for Dental Implants" in Clinical Oral Implants Research.

7-Bone Grafting Materials and Techniques in Dental Implantology: A Survey of Recent Advances" in Journal of Prosthodontics.

8-Review of Current Techniques and Materials for Bone Grafting in Implant Dentistry: A Survey" in Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology