

**Knowledge And Awareness About The Usage of Bonegrafts And Periodontal Regeneration Among The Undergraduates. A Cross- Sectional Questionnaire Survey.**

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**Citation of this Article:** M.Yuvasandhiya Devi, A.V Saravanan,P.L.Ravishankar, “Knowledge And Awareness About The Usage of Bonegrafts And Periodontal Regeneration Among The Undergraduates. A Cross- Sectional Questionnaire Survey”, IJDSIR- November - 2020, Vol. – 3, Issue - 6, P. No. 57 – 63.

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**Type of Publication:** Survey Article

**Conflicts of Interest:** Nil

**Abstract**

AIM: Awareness about the bone grafts in treating the intrabony defects in the periodontal disease is considered to be mandatory. The aim of this study was to assess the knowledge and perception of undergraduates towards the usage of bonegrafts in periodontal defects.

**Materials And Methods:** This cross sectional questionnaire based survey was conducted after ethical clearance obtained from SRM Institute of Technology. There were 220 participants were included in the study. The samples were included all those students present at the time of survey. Data collection were carried out and coded in Microsoft excel.

**Results:** A majority of all participants included in the study (77 .25 %) were concluded in right manner that

which type of bonegraft is better for regeneration. About 65.5% of the participants are having well awareness about the regeneration period of bonegrafts. But about 45.90% of them are not well understood about the failure of bonegrafts.

**Conclusion:** It is well understood that the knowledge of placement of bone grafts in the treatment of intrabony defects in periodontal disease in order to avoid the loss of teeth and the longevity of tooth in the oral cavity can be extended for number of years.

**Keywords:** Bone graft, Intrabony defects, Periodontal disease, Regeneration.

**Introduction**

Periodontal disease is a complex infectious disease resulting from interplay of bacterial infection and host

response to bacterial challenge and the disease is modified by environmental, acquired risk factors and genetic susceptibility. Bone defects often result from tumour resection, congenital malformation, trauma, fractures, surgery or periodontitis as well as from diseases such as osteoporosis or arthritis.<sup>(1)</sup> One of the biggest challenges in dentistry is to predictably regenerate the alveolar bone destroyed by periodontal disease.<sup>(2)</sup> The first generation of biologics approved for periodontal regeneration was introduced to the market in the late 1990's.<sup>(3)</sup> Periodontal regeneration is defined as regeneration of tooth supporting tissues, including alveolar bone, PDL and cementum.<sup>(4)</sup> The primary goal of periodontal regeneration is to restore the periodontium. Based on current knowledge of the biology of periodontal regeneration, three main avenues of research are currently being pursued that aim to improve clinical periodontal regenerative techniques. These include the improved therapeutic application of bioactive molecules, the potential for stem cell implantation and the application of biomaterials for improved scaffolds or GTR membranes, which might also be used for drug delivery or stem cell delivery.<sup>(5)</sup> Over the past two decades, various regenerative therapies such as guided tissue regeneration, enamel matrix derivative, bone grafts, growth factor and the combination of cells and growth factors with matrix based scaffolds have been developed to target the restoration of lost tooth supporting tissues.<sup>(6)</sup> Goldman and Cohen classified intrabony defects according to the number of osseous walls surrounding the defect.<sup>(7)</sup> The three wall intrabony defect is classically considered ideal for regeneration.<sup>(8)</sup> Currently, osseous grafting and guided tissue regeneration are the two techniques with the most histologic documentation of periodontal regeneration.<sup>(9-11)</sup> Nowadays, a bonegraft is a dynamic tool that supports normal forces and incorporates itself into the bed, revascularize as new bone forms. Additionally, bonegraft

and its substitutes provide structural support for several healing defects.<sup>(12,13)</sup> Three different processes are including in successful bonegrafting namely osteogenesis, osteoconduction and osteoinduction. All bone grafting materials possess at least one of these modes of action.<sup>(14)</sup> Three types of bone graft material are used such as autogenous bone graft, allograft, alloplast and xenografts also used. Autogenous bone grafts are grafts harvested from the same patient and form new bone by osteogenesis, osteoinduction and osteoconduction. Allografts are grafts transferred from an individual other than the one receiving the graft.<sup>(15)</sup> Alloplasts is a synthetic graft or inert foreign body implanted into the tissue.<sup>(16)</sup>

### **Materials And Methods**

This cross sectional questionnaire based survey was conducted in the Department of Periodontics, SRM Kattankulathur Dental College in the period of June 2020 to September 2020 after getting ethical committee clearance. There were 220 participants included in the study. The population included in the study were undergraduate practitioners in and around Chennai and undergraduate interns in the college. The sample collected from those students and practitioners present during the survey were included and those who were absent were excluded from the study. Data were collected through a questionnaire prepared by the investigator. Data collection were carried out during term - time supervised directly by the investigator. Collected data were coded in the Microsoft excel and descriptive analysis were carried out in a suitable manner.

### **Results**

The total number of undergraduates included in the study was 220. 120 undergraduate students and 100 undergraduate practitioners were included. Percentage of knowledge and perception shown by undergraduates were presented in Table 1 & figure 1. Table 1 & figure 1 shows

the percentage (77.25 %) of participants were concluded in right manner that which type of bone graft is better for regeneration. A majority of the participants (65.5%) are having well awareness about the regeneration period of bone grafts. But about 45.90% of them are not well understood about the failure of bone grafts. Piechart shows the overall percentage of knowledge about bone graft material in undergraduate students is 48.9% and undergraduate practitioners is 58.4% (figure:2). There were little differences in the knowledge and attitude towards the bone graft material among the undergraduates, but not as expected carried out in a suitable manner.

Table: 1-Percentage of Correct responses Given By Undergraduates.

Good Knowledge	UG interns	UG practitioners
	%	%
Q1	60.0%	80.0%
Q2	53.0%	54.2%
Q3	52.0%	79.2%
Q4	60.0%	63.3%
Q5	49.0%	52.0%
Q6	34.0%	46.0%
Q7	60.0%	80.0%
Q8	42.0%	54.0%
Q9	50.0%	62.5%
Q10	44.0%	46.7%
Q11	51.0%	50.8%
Q12	16.0%	40.0%
Q13	57.0%	57.5%
Q14	67.0%	70.8%
Q15	41.0%	40.8%

Q16	33.0%	42.5%
Q17	62.0%	71.7%

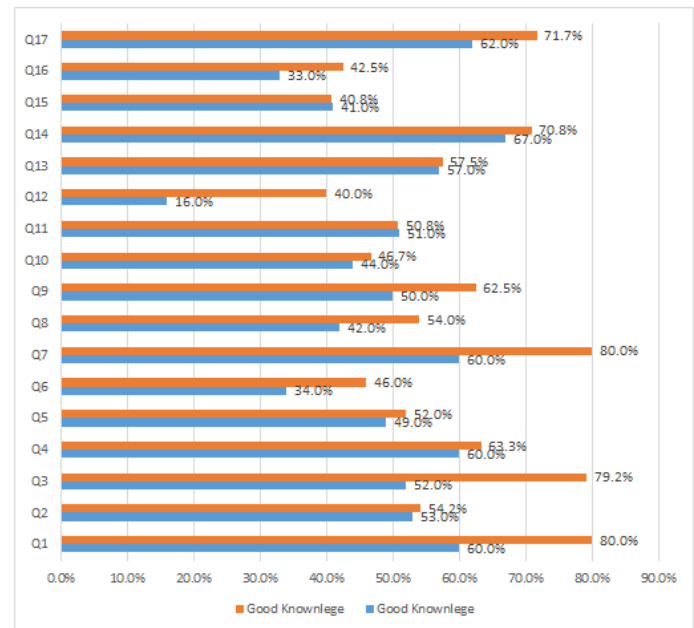


Figure 1: Bar Diagram Shows The Percentage Of Responses Given By Undergraduate Students And Practitioners.

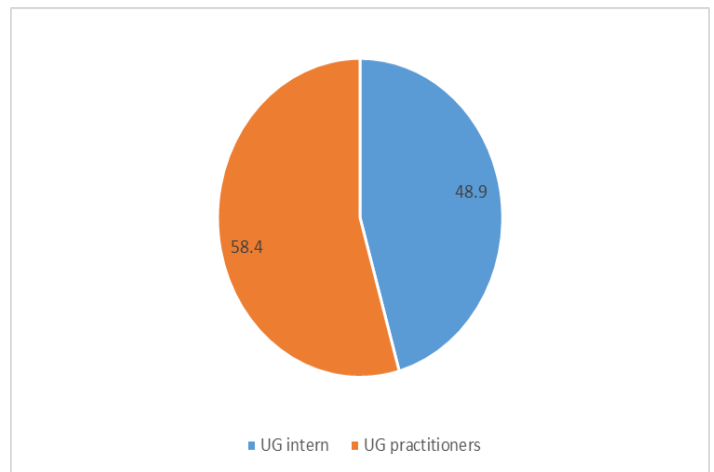


Figure 2: Pie Chart Shows The Overall Knowledge of Usage of Bone grafts By Undergraduates.

Table 2: Questionnaire

	Variables	Categories	Count (n)	Percentages (%)
	Respondents	UG Practitioners	100	45.46
		UG Interns	120	54.54
	Gender	Male	64	29.1
		Female	156	70.9
1	Which type of graft is better for bone regeneration?	Auto graft	172	77.25%
		Allograft	28	13.55%
		Alloplast	18	8.55%
		Not Answered	2	0.65%
2	Which alloplastic material is most commonly used?	Hydroxyapatite	118	51.65%
		Bioactive glass	30	14.20%
		Tricalciumphosphate	40	22.05%
		Plaster of Paris	26	10.20%
		Not answered	6	1.90%
3	Which of the following factor is most commonly affect bone regeneration?	Smoking	26	13.90%
		Diabetes	18	7.65%
		All of the above	174	77.90%
		Not answered	2	0.65%
4	Following bone graft procedure, bone regeneration is formed between	1-2 month	66	27.60%
		4-6 months	138	65.45%
		9-12 months	12	5.70%
		Not answered	4	1.30%
5	Which type of defect has more failure in periodontal regeneration?	Horizontal	60	28.45%
		Vertical	100	45.90%
		Craters	52	23.15%
		Not answered	8	2.55%
6	Freeze dried allograft is	Osteoconductive	110	50.00%
		None	30	12.40%
		Osteoinductive	74	33.85%
		Not answered	6	3.80%
7	Do you think graft failure is only due to periodontal diseases?	Yes	38	21.40%
		No	178	77.35%
		Not answered	4	1.30%
8	Chemical process by which molecule contained in the graft that convert the nearby cells into osteoblast which in turn form bone?	Osteoconduction	56	23.50%
		Osteoinduction	90	42.70%
		Osteogenesis	70	32.60%
		Not answered	4	1.30%
9	GTR is placed during bone grafting procedure for the following purpose	Acts as a barrier	66	29.45%
		Promotes regeneration of pdl, cementum and bone	16	6.05%
		All of the above	134	63.25%
		Not answered	4	1.30%
10	Was bone graft placed along with ridge splitting or was the split to heal on its own?	Split to heal on its own	76	33.60%
		Depends on the site	100	47.70%
		Better to placed with xenograft	34	15.50%
		Not answered	10	3.20%
11	Extracted tooth can be used as an autogenous bone graft?	Yes	54	22.85%
		No	44	20.55%

		Depends on the infection surrounds the tooth	112	51.55%
		Not answered	10	5.05%
12	Non bone graft materials include	Sclera	36	17.10%
		Plaster of Paris	52	24.05%
		All of the above	128	57.65%
		Not answered	4	1.30%
13	Risk of disease transmission is high in	Auto graft	20	8.30%
		Allograft	70	31.70%
		Xenograft	126	58.80%
		Not answered	4	1.30%
14	Which cell is responsible for graft rejection?	B cell	60	27.50%
		T cell	152	69.90%
		Not answered	8	2.55%
15	In combined techniques of bone grafting following can be used	Emdogain	44	16.90%
		Bio oss	38	15.85%
		None of the above	40	19.30%
		All of the above	90	45.45%
		Not answered	8	2.55%
16	Which graft material is better other than autogenous bone graft to achieve for the best result in sinus augmentation?	Bovine bone	74	33.85%
		Tricalcium phosphate	68	31.95%
		All of the above	72	32.30%
		Not answered	6	1.90%
17	Is true periodontal regeneration achievable?	Yes	40	20.20%
		No	18	10.35%
		Depends on the defect	158	68.15%
		Not answered	4	1.30%

## Discussion

Bone tissue is a rich source of growth factor, including BMPs, platelet -derived growth factor, insulin like growth factor -1, vascular endothelial growth factor and fibroblast growth factor. The BMP family is considered to be the most important group of molecules of this category including members like BMP-2, 4,6,7 that exhibits satisfactory bone growth.<sup>(17)</sup> The basic problem pertaining to all bone filler materials is that a biologic rationale for the regeneration of the periodontium is missing . Bone grafts or bone substitute materials do not possess the ability to regenerate lost connective tissue attachment.<sup>(18)</sup>

Differences were seen in the response of undergraduate students and practitioners at different levels as expected. A majority of all students and practitioners for the knowledge about the graft is better for bone regeneration

is 77.25%. Similarly, the evidence shows that knowledge about the factor which affect the bone regeneration is around 77.90%. A majority of students and practitioners of about 65.5% are well known about the regeneration period of bone grafts. But the knowledge about the failure in regeneration is about 45.90% among the undergraduates is fair to poor as not as expected. A majority of knowledge about the failure of bone grafts is not only due to periodontal disease is about 77.35% by the undergraduates is good as expected. Current evidence shows that the knowledge about the periodontal regeneration is possible and its only depends on the defect. And it's given by around 68.15% by undergraduate students and practitioners. Overall above evidences gathered from questionnaire clearly shows the knowledge about the undergraduates is well understood.

## Conclusion

Knowledge and awareness about the usage of bonegrafts in the treatment of periodontal bony defects among the undergraduate students and practitioners is differed at different levels. It was expected to increase in undergraduate level because the students and practitioners gave unsatisfactory responses for some questions. To overcome this, there is a need to improve the knowledge about the usage of bone grafts by means of giving more clinical training, a need for curriculum review, improve the evaluation of teaching materials, concerned workshops and clear guidelines about the usage of bone grafts among the undergraduate students and practitioners. By doing this during their curriculum, undergraduates will have an idea for the usage of bone grafts in a periodontal bony defect.

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