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Research Article

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Management of Peri Implantitis by Implant Oriented Clinical Practitioners Across Kalaburagi. A Cross-Sectional Questionnaire Study

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ABSTRACT

Objectives: This survey-based study aims to assess the effectiveness of methods used for determining the peri implant tissue health and also to determine the updated knowledge in the management of peri implant diseases by implant practitioners across Kalaburagi.

Materials and Methods: A cross-sectional survey was conducted among dentists practicing implant dentistry in the Kalaburagi region. Data were collected using a standardized online questionnaire, which was distributed to local practitioners. A total of 120 dentists were approached and informed about the objectives of the study. Of those, 75 dentists (62.5%) were included in the final analysis, as they provided fully completed responses. The initial section of the questionnaire focused on participants' experience with implant placement, the average number of implants placed annually, and the system of implant most commonly used in their clinical practice. The remaining items addressed protocols for the prevention and management of peri-implantitis.

Results: The majority of the 75 practitioners polled had less than five years of implant experience (100%) and placed fewer than ten implants per year (62.7%). The most popular implant systems were German (22.7%) and Israeli (33.3%). 72% of patients were typically recalled every three months, with clinical examination (46.7%) and education (65.3%) being the most important recall processes. The prevalences of peri-implantitis and peri-implant mucositis were 84% and 86.7%, respectively. Stage 1 peri-implantitis was most common (77.3%), and diabetes was the most common related disease (86.7%). Peri-implantitis rates were higher in cement-retained prostheses (60%) than in other types.

The main methods of assessment were probing depth (88%) and bleeding on probing (92%). The preferred radiographs (62.7%) were IOPAs. The most common forms of treatment were non-surgical debridement (53.3%), antimicrobial rinses (61.3%), and oral hygiene education (72%). The most common surgical procedures were allografts (56%) and regenerative treatment (57.3%). For debridement and implantoplasty, ultrasonic scalers (60%) and diamond burs (50.7%) were the instruments of choice. The ratings ranged from very effective (48%), to moderate (49.3%).

Conclusion: Implantology has grown leaps and bound in the past few years, and so have Peri-implantitis. Based on these, it is recommended that practitioners should update themselves with a special focus on educating dentists in diagnosing the complications of implants and treating them.3 months follow up after an implant placement by a consultant periodontist should always be considered for the management of Peri implant tissues in order to prevent Peri implant diseases.

Introduction

The great long-term success rates and functional advantages of dental implants have made them a widely recognized and reliable method for replacing lost teeth. However, biologic complications most notably, peri-implant disorders, such as peri-mucositis and peri-implantitis have increased in tandem with the

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growing number of implants implanted each year [1].

The tissues surrounding dental implants are susceptible to peri-implantitis, a site-specific, plaque-associated pathological condition marked by inflammation of the peri-implant mucosa and the progressive loss of supporting bone that follows. Peri-mucositis, on the other hand, is a reversible inflammatory reaction that only affects soft tissues. Based on follow-up periods and diagnostic criteria, the prevalence of peri-implantitis varies from 10% to 40% of implant sites (Derks & Tomasi, 2015; Berglundh et al., 2018).

Poor plaque control, a history of periodontitis, residual cement, insufficient keratinized mucosa, biomechanical overload, systemic conditions such as diabetes mellitus, and patient compliance with supportive therapy are among the biological and mechanical risk factors that contribute to the multifactorial etiology of peri-implantitis (Heitz-Mayfield & Mombelli, 2014). To stop the course of the disease and maintain implant longevity, prompt diagnosis and adequate treatment are essential.

Clinical characteristics, including probing depth, bleeding on probing, suppuration, and mucosal health, as well as radiographic evidence of crestal bone loss, are the main basis for diagnosis. Because of variations in training, experience, access to diagnostic equipment, and accessible treatment modalities, doctors' clinical practices regarding the diagnosis and management of peri-implantitis varied greatly, even in the face of published standards [2].

Implant dentistry is growing quickly in India, particularly in different states like Karnataka. However, little information is available about how clinicians in the region treat peri-implantitis in various circumstances. Identifying knowledge and practice gaps through an understanding of their diagnostic and treatment trends can assist direct the development of evidence-based protocols and ongoing education.

Materials and Methods

The present cross-sectional survey was carried out among implant dentists in the Kalaburagi area. The dentists were given a standardised online questionnaire to complete in order to collect data. We informed 120 dentists throughout the city about the purpose of the study. Only 75 (62.5%) of the 120 dentists who agreed to participate in the study were included because their forms were completed [3].

The first three questions assessed the participants' level of experience in implant placement, the number of implants they place annually, and the system of implant most commonly used in their clinical practice. The remaining questions focused on prevention and therapy strategies for peri-implantitis [4,5].

Questionnaire

1. Years of experience in clinical implant practice
- <5
- 5-9
- 10-19
- >19

2. Number of implants placed per year.
- < 10
- 10-15
- 15-20
- >20

3. Which system of implant is used in your clinic
- Indian
- German
- Switzerland
- Israel
- Korean
- USA
- Brazil
- Other

4. Recall of patient after implant placement
- 3 months
- 6 months
- 9 months
- 1 year

5. Procedures performed in the recall visits

	3 months	6 months	9 months	1 year	2 years
Oral prophylaxis					
Educating patients on oral hygiene maintenance					
Evaluating implant stability clinical Examination of peri mucosal and peri implant tissue					

6. Prevalence of peri mucositis among patients
- 10-25%
- 25-50%
- 50-70%

7. Prevalence of peri Implantitis among patients
- 10-25%
- 25-50%
- 50-70%

8. How do you do clinical assessment for Peri Implantitis in recall visit, do you follow these methods?
- Peri implant plaque assessments
- Peri implant mucosal index
- Bleeding on probing
- peri implant probing depth
- Width of peri implant keratinized mucosa
- Peri implant sulcus fluid analysis
- Suppuration

9. What type of radiographic evaluation do you prefer for peri Implantitis
- Intra oral peri Apical (IOPA) radiographs
- Orthopantomogram (OPG)
- Cone Beam Computed Tomography

10. Peri Implantitis was most commonly encountered in the which recall visit
- 6 months
- 1 year
- 2 years
- More than 2 years

11. Most common type of peri Implantitis encountered
- Stage 1: Early (PD≥4mm, BOP present, bone loss < 25% of implant length)
- Stage 2: Moderate (PD≥6mm, BOP present, bone loss 25% to 50% of implant length)
- Stage3: Advanced (PD≥8mm, BOP present, bone loss > 50% of implant length)

12. Most common Etiological factor for Peri Implantitis
Ranking weighted score out of 8

1 2 3 4 5 6 7 8
Inadequate plaque control
occlusal overloading/para functional habits
Smoking
Systemic conditions
others

13. Peri Implantitis was most commonly encountered in patients with which systemic disorders
- Diabetes mellitus
- Hypertension
- Obesity
- Osteoporosis
- cardiovascular disorders
- Others

14. The Percentage of Peri Implantitis cases was found to be
- More in cement retained prosthesis
- More in Screw retained prosthesis
- Similar in both the cases

15. Frequency of relative use of treatment methods of Peri Implantitis
Always Often Sometimes Rarely Never
- OHI
- Antimicrobial gel/mouthrinse
- Nonsurgical debridement
- surgical debridement
- Local antibiotics
- Systemic antibiotics
- control of occlusion

16. Instrumentation used for debridement of implant surfaces in peri implant disease
- ultrasonic scaler
- Sonic scaler
- Titanium scaler
- Air abrasive device
- Stainless steel instruments
- Er YAG LASER
- Diode LASER
- OTHERS

17. Type of surgical intervention practiced to manage moderate to advanced form of Peri Implantitis
- Regenerative / augmentation therapy (open flap debridement with regenerative material)
- Resective therapy with implantoplasty (removal of implant threads to create smooth surface)
- combination therapy

18. Frequently used regenerative materials
- Resorbable GTR membranes
- Non resorbable GTR membrane
- Growth factors
- Bone grafts
- connective tissue grafting
- combination of the above

19. Type of bone grafts used
- Xenografts
- Allografts
- Autografts

20. Type of Instruments used in treatment of implantoplasty
- Diamond burs
- Arkansas stone and silicone polishes
- Combination

21. Recall frequency after surgical intervention
- Every 3months
- Every 6 months
- Every 9 months

22. Number of implant failure due Peri Implantitis.
- >5
- 5-10
- <10

23. How effective were the treatment modalities that was followed
- Very effective
- Moderately effective
- Least effective

Results

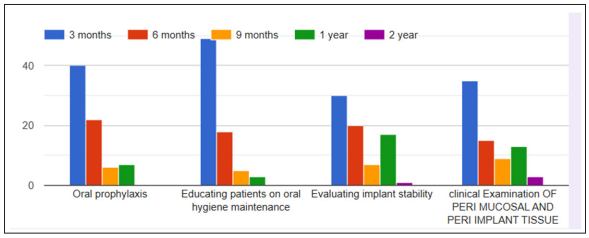
75 dentists participated in this survey-based study, which evaluated their clinical procedures, evaluation procedures, and peri-implantitis treatment approaches. The majority of doctors put fewer than 10 implants per year (62.7%) and had less than 5 years of implant experience (100%). German (22.7%) and Israeli (33.3%) implant systems were the most often used. Oral prophylaxis (53.3%), patient education (65.3%), and clinical evaluation (46.7%) were prevalent procedures, and 72% of patient recall appointments were scheduled at 3-month intervals. (Table no. 1)

ITEM	Subcategory	Frequency	Percent
1. Years of experience in clinical implant practice	<5	75	100.0%

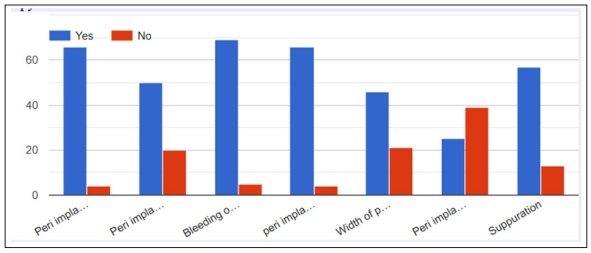
2. Number of implants placed per year	<10	47	62.7%
	>20	23	30.7%
	15-20	5	6.7%
3. Which system of implant is used in your clinic	German	17	22.7%
	Indian	16	21.3%
	Israel	25	33.3%
	Korean	9	12.0%
	Switzerland	6	8.0%
	USA	1	1.3%
4. Recall of patient after implant placement	1 Year	5	6.7%
	3 months	54	72.0%
	6 months	15	20.0%
	9 months	1	1.3%

The majority of practitioners performed recall visit procedures at 3-month intervals, with 53.3% conducting oral prophylaxis, 65.3% providing patient education, 40.0% evaluating the implant, and 46.7% performing clinical examinations during this period. Procedures conducted at 6-month, 1-year, and longer intervals were less frequent, indicating a clear preference for a 3-month recall schedule in peri-implant maintenance. (Table 2)

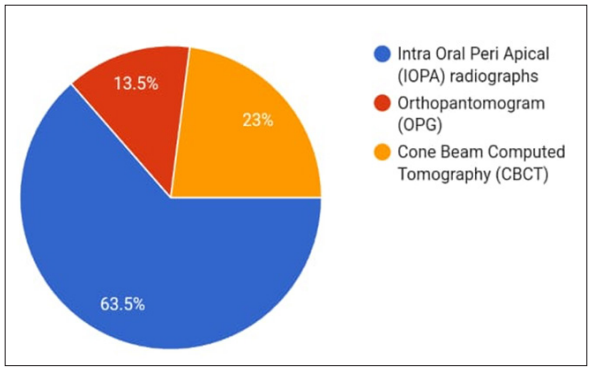
Procedures performed in the recall visits (Oral prophylaxis)	1 year	7	9.3%
	3 months	40	53.3%
	6 months	22	29.3%
	9 months	6	8.0%
Procedures performed in the recall visits (Educating patient)	1 year	3	4.0%
	3 months	49	65.3%
	6 months	18	24.0%
	9 months	5	6.7%
Procedures performed in the recall visits (Evaluating implant)	1 year	17	22.7%
	2 year	1	1.3%
	3 months	30	40.0%
	6 months	20	26.7%
	9 months	7	9.3%
5. Procedures performed in the recall visits (Clinical examination)	1 year	13	17.3%
	2 year	3	4.0%
	3 months	35	46.7%
	6 months	15	20.0%



(Q8) Peri-implant plaque evaluation (88.0%), peri-implant probing depth measurement (88.0%), and bleeding on probing (92.0%) are the most often employed clinical assessment techniques for peri-implantitis in recent cases. Assessments of the width of the peri-implant keratinised mucosa (61.3%) and the peri-implant mucosal index (66.7%) are also commonly used. Peri-implant sulcus fluid analysis (33.3%) and suppuration evaluation (82.7% of doctors) are less often employed techniques. (Figure)



How do you do clinical assessment for peri-implantitis in recent cases? [Peri implant plaque assessment]	No	4	5.3%
	Yes	66	88.0%
How do you do clinical assessment for peri-implantitis in recent cases? [Peri implant mucosal index]	No	20	26.7%
	Yes	50	66.7%
How do you do clinical assessment for peri-implantitis in recent cases? [Bleeding on probing]	No	5	6.7%
	Yes	69	92.0%
How do you do clinical assessment for peri-implantitis in recent cases? [peri implant probing depth]	No	4	5.3%
	Yes	66	88.0%
How do you do clinical assessment for peri-implantitis in recent cases? [Width of peri implant keratinized mucosa]	No	21	28.0%
	Yes	46	61.3%
How do you do clinical assessment for peri-implantitis in recent cases? [Peri implant sulcus fluid analysis]	No	39	52.0%
	Yes	25	33.3%
How do you do clinical assessment for peri-implantitis in recent cases? [Suppuration]	No	13	17.3%



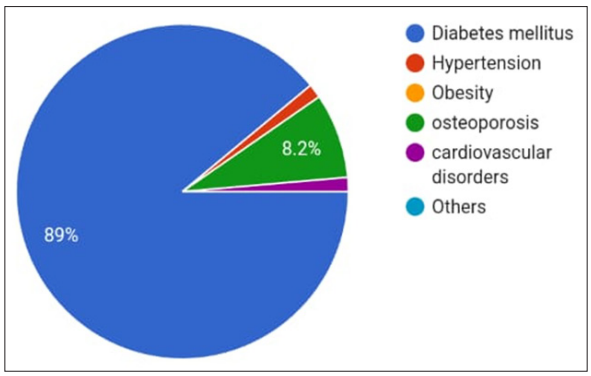
Q.09) When asked about the preferred radiographic method for the evaluation of peri-implantitis, the majority of practitioners (63.5%) reported using intraoral periapical radiographs (IOPA).

Question	Frequency	Percent
@10 Peri-implantitis was most commonly encountered in the which period?		
- 1	1	1.3
- 1 year	28	37.3

- 2 years	13	17.3
- 6 months	16	21.3
- More than 2 years	17	22.7
Total	**75**	**100.0**
@11 Most common type of peri-implantitis encountered		
- 1	1	1.3
- Stage 1: Early (PD≥4mm, BOP present, bone loss < 25% of implant length)	58	77.3
- Stage 2: Moderate (PD≥6mm, BOP present, bone loss 25% to 50% of implant length)	14	18.7
- Stage 3: Advanced (PD≥8mm, BOP present, bone loss > 50% of implant length)	2	2.7
Total	**75**	**100.0**

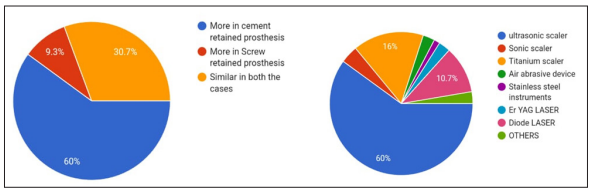
Peri-implantitis was most commonly encountered within the first year following implant placement, as reported by 37.3% of practitioners. A considerable proportion of cases were also observed after more than 2 years (22.7%), while 21.3% of practitioners encountered the condition as early as 6 months. Peri-implantitis was noted at 2 years by 17.3% of respondents, whereas only 1.3% reported its occurrence within less than 6 months.

The majority of practitioners (77.3%) reported encountering Stage 1 (early) peri-implantitis, characterized by probing depths ≥4 mm, bleeding on probing, and bone loss limited to less than 25% of the implant length. This suggests that peri-implantitis is often identified at an early stage, possibly due to regular recall visits and timely diagnosis. Stage 2 (moderate) peri-implantitis was reported by 18.7% of practitioners, while Stage 3 (advanced) peri-implantitis was relatively uncommon, with only 2.7% of practitioners encountering such cases. The predominance of early-stage cases highlights the importance of routine maintenance therapy and early intervention in preventing disease progression and implant failure.

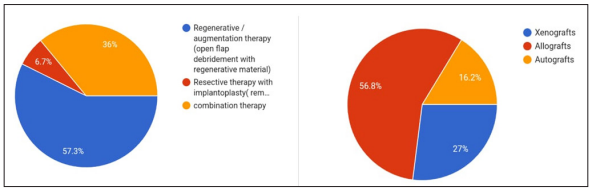


(Q.no.11) The ranking of etiological factors revealed variability among practitioners. Across responses, the most frequently cited factors included poor oral hygiene and inadequate plaque control, prosthesis-related issues (especially cement-retained restorations), and systemic conditions such as diabetes. A substantial proportion of practitioners (28% in one ranking) placed oral hygiene as the primary factor, followed closely by prosthetic design (25.3%). Other contributors such as surgical technique, occlusal overload, and smoking were ranked lower but still recognized. These findings suggest that both patient-related (plaque, systemic health) and iatrogenic factors (prosthetic design, surgical considerations) are perceived as major contributors to peri-implantitis in clinical practice.

(Q.No.12) Peri-implantitis was most commonly reported in patients with diabetes mellitus (86.7%), followed by those with osteoporosis (8%), while cardiovascular disorders and hypertension were rarely associated. This highlights diabetes as the predominant systemic risk factor for peri-implantitis among the study population.



(QNo.14): Peri-implantitis was more frequently observed in cement-retained prostheses (60%) compared to screw-retained prostheses (9.3%), while 30.7% of practitioners reported similar prevalence in both types. (QNO. 15) Among management approaches, the most consistently practiced method was oral hygiene instruction (OHI), reported as "always" by 72% of practitioners. Antimicrobial gels/mouthrinses (61.3% always) and non-surgical debridement (53.3% always) were also widely adopted. Surgical debridement was less commonly performed, mostly "sometimes" (37.3%), reflecting a preference for non-surgical therapy as first-line management. Use of local and systemic antibiotics showed variability, with most practitioners employing them "often" or "sometimes." Control of occlusion was practiced inconsistently, with only 17.3% reporting "always." (QNo.16) Ultrasonic scalers (60%) and titanium scalers (16%) were the most commonly used instruments for implant surface debridement, while advanced devices such as diode lasers (10.7%) and air-abrasive systems (2.7%) were infrequently used.



(QNo.17) For moderate peri-implantitis cases, the majority of practitioners preferred regenerative/augmentation therapy (57.3%), followed by combination therapy (36%). Resective approaches with implantoplasty were least common (6.7%). (Q.18) The most commonly used regenerative materials were bone grafts (37.3%) and their combinations (38.7%), while resorbable GTR membranes (18.7%) were used to a lesser extent. Growth factors and non-resorbable membranes were rarely employed (2.7% each). Among bone grafts, allografts (56%) were most frequently used, followed by xenografts (26.7%) and autografts (16%).

@20 Type of instruments used in treatment of implantoplasty		
Arkansas stone and silicone polishes	5	6.7
Combination	29	38.7
Diamond burs	38	50.7
Total	75	100.0
@21 Recall frequency after surgical intervention		
Every 3 months	59	78.7
Every 6 months	12	16.0
Every 9 months	4	5.3
Total	75	100.0
@22 Number of implant failure due Peri-Implantitis		
<10	6	8.0
>5	57	76.0
45570	10	13.3
Total	75	100.0
@23 How effective were the treatment modalities that was followed		
Moderately effective	37	49.3
Very effective	36	48.0
Total	75	100.0

Discussion

Peri-implantitis can result in implant failure, and this issue is more commonly encountered by dental professionals who lack sufficient knowledge, skills, and expertise in implant placement.

This questionnaire study provides information about the present patterns in Karnataka's clinical implant practitioners diagnosis and treatment of peri-implant disorders. The results, which are backed by comparisons with existing literature, represent current clinical practices, diagnostic vigilance, and treatment choices for peri-implantitis.

Experience and Exposure in Clinical Settings

62.7% of respondents placed fewer than 10 implants a year, and all respondents (100%) reported having less than five years of experience in implant dentistry. This comparatively early experience might be a reflection of young practitioners' growing interest in implant dentistry. Schwarz et al. (2018) pointed out that limited case exposure may affect treatment decisions and diagnostic consistency, emphasizing the need of clinical training and experience in managing peri-implant illness.

Implant Systems and Procedures for Recall

Indian (21.3%), German (22.7%), and Israeli (33.3%) implant systems were utilized by the majority of practitioners. According to Aggarwal et al. (2021), who noted comparable preferences in Indian private practice, these selections most likely reflect availability and cost-effectiveness in Indian markets.

72% of respondents planned follow-up visits every three months after implant placement, which is consistent with the existing understanding that shorter recall intervals improve early identification of peri-implant inflammation (Lang & Berglund, 2011). The most common times for oral prophylaxis and patient education were during 3-month visits, highlighting the understanding that oral hygiene is a controllable risk factor.

Frequency and Identification of Peri-Implant Disorder

86.7% and 84.0% of respondents, respectively, reported having peri-mucositis and peri-implantitis, with the majority estimated a disease prevalence of 10–25%. Derks and Tomasi (2015) estimated the prevalence of peri-implantitis at 22% and peri-mucositis at up to 43% worldwide, which is in line with this data.

The diagnostic techniques used were generally thorough: peri-implant probing depth (88%), plaque assessment (88%), bleeding on probing (92%), and suppuration evaluation (76%). However, less was done with more sophisticated diagnostics including mucosal index (66.7%) and peri-implant sulcus fluid analysis (33.3%). Despite their demonstrated value in detecting subclinical inflammation, this might be the result of restricted access or knowledge (Mombelli & Décaillet, 2011).

In terms of radiography, the most often used radiographs were IOPA (62.7%), CBCT (22.7%), and OPG (13.3%). According to research by Monje et al. (2016), CBCT offers better accuracy in assessing buccolingual abnormalities and crater-like bone loss, even though IOPA is dependable for longitudinal bone level comparisons.

Etiology and Patterns of Peri-Implantitis

Because peri-implantitis is a persistent condition, it was most commonly seen during the 1-year (37.3%) and post-2-year (22.7%) recall visits. Early peri-implantitis, or Stage 1, was the most frequently observed stage (77.3%), indicating prompt discovery and treatment.

In terms of causation, systemic diseases and occlusal overloading were consistently placed second and third, respectively, after poor plaque control. According to Berglundh et al. (2018), who identified biofilm accumulation, biomechanical loading, and systemic conditions—particularly diabetes—as the main causes, these data corroborate the complex nature of peri-implantitis.

In fact, among the afflicted patients, diabetes mellitus was the most often linked systemic illness (86.7%). Because of the heightened inflammatory response and poor wound healing, its function as a modifying factor has been extensively established in the literature (Chrcanovic et al., 2014).

Trends in Prosthetic Design Failure

According to Linkevicius et al. (2013), cement-retained prostheses were linked to a greater incidence of peri-implantitis (60%)—a pattern that was well-documented. They attributed this to inflammation caused by leftover submucosal cement. Because screw-retained prostheses are easy to retrieve and don't have cement borders, they have been shown to have fewer issues.

Methods of Treatment

The most often utilized modality was oral hygiene education (72%), which was followed by nonsurgical debridement and

antibacterial mouthrinses. Surgical debridement was used "sometimes" or "often" in 73.3% of patients, whereas it was less frequently done "always" (8%). This probably reflects practitioners' inclination for conservative therapy and the early-stage presentation of the disease.

Although current data recommends limited and prudent usage to prevent resistance, systemic antibiotics (used by 82.6%) and local antibiotics (82.6%) were commonly recommended (Heitz-Mayfield et al., 2022). According to research showing its important role in disease progression, occlusal control—a crucial component of biomechanical overload management—was frequently (29.3%) or occasionally (36%) taken into consideration (Rodriguez & Nowzari, 2019).

Surgical Management and Instrumentation

For implant surface debridement, ultrasonic scalers (60%) and titanium scalers (16%) were most commonly utilized, which makes sense given their biocompatibility. Nevertheless, 1.3% of respondents said they have used stainless steel tools, which should be avoided as they may harm implant surfaces (Subramani et al., 2009).

Regenerative/augmentation therapy (57.3%) was the preferred surgical approach, frequently utilizing combination materials (38.7%) or bone grafts (37.3%). This is in line with Renvert & Polyzois (2015), who advocate for the preservation of peri-implant structures. Because allografts are readily available and have low donor site morbidity, the majority of doctors (56%) preferred them to xenografts and autografts.

For implantoplasty, a combination of polishing tools (38.7%) and diamond burs (50.7%) were utilized, in accordance with clinical guidelines for producing a smooth, plaque-resistant surface. In accordance with guidelines to rigorously monitor postoperative healing and illness recurrence, 78.7% of patients had recall appointments arranged every three months after surgery (Schwarz et al., 2018).

Conclusion

Both implantology and peri-implantitis have advanced significantly in recent years. These findings suggest that practitioners should keep up to date, with a particular emphasis on teaching dentists how to identify and manage implant issues. In order to prevent peri-implant disorders, peri-implant tissues should always be managed by a specialist three months following implant placement. Peri-implant diseases are common among patients with dental implants. A consultant periodontist should always be involved in both pre- and post-implant site management to prevent peri-implantitis.

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