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Original article

Attitude and Awareness of Dentists Towards Resin-Bonded Bridges in Benghazi, Libya

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Abstract
Resin-bonded bridges offer a simple and conservative approach to tooth replacement. However, the use of this treatment option has been limited in terms of practicality and effectiveness. Therefore, this study aimed to evaluate the attitude and awareness of dentists towards resin-bonded bridges (RBBs) in Benghazi. An online survey was conducted with 200 dentists registered with the Libyan Dental Syndicate. A structured questionnaire, adapted from previous studies, was distributed through Google Forms to gather data on demographics, professional qualifications, attitudes, and awareness of resin-bonded bridges. The data were analyzed using SPSS version 25.0. Out of 300 distributed questionnaires, 200 dentists responded, giving a response rate of 67%. A majority, 83.8% of specialists and 88.1% of general dental practitioners, used RBBs in <10% of their prosthodontics cases. A total of 94.9% of SPs and 67.3% of GPs considered RBBs as a provisional restoration. Additionally, the participants, 98% of SPs and 83.2% of GPs, regarded debonding as the biggest disadvantage of RBBs. Focused educational programs and hands-on training in resin-bonded bridges are needed to bridge the gap between theoretical knowledge and clinical application of RBBs. These efforts will empower GPs and SPs in Benghazi, leading to better patient outcomes and expanding restorative treatment options.
Keywords. Resin Bonded Bridges, Attitude, Awareness, General Practitioners, Specialist.

Introduction

Resin-bonded bridges (RBBs) are minimally invasive fixed dental prostheses that have been utilized to restore short edentulous spans [1]. For many years, RBBs have offered a conservative and cost-effective approach as well as better patient satisfaction than conventional full-coverage fixed partial dentures [2-4]. Despite this, they are not frequently used or considered as an option for replacement due to their high failure rates [1,5]. They were introduced to the dentistry world in the 1970s by Rochette for periodontal splinting by the concept of bonding a metal retainer to enamel using adhesive resin [1,6,7]. Early versions of RBBs demonstrated poor longevity. However, advancements in restorative and adhesive technology have propelled the evolution of RBBs, enhancing their strength, aesthetics, and longevity. The evolution of RBBs has also expanded their clinical indications, making them suitable for a broader range of cases, with current evidence allowing their application to long-term tooth replacement in appropriate clinical scenarios [8,9,10].

The resin-bonded bridge allows the concept of minimal intervention dentistry through the preservation of tooth structure, preservation of pulp vitality, treatment reversibility (when RBBs are used as a provisional restoration), minimal catastrophic failure than the conventional bridges, minimal soft tissue interaction, and ease of retrievability. Even though they are rarely addressed and have the undeserved reputation of failure [5,6]. Unsuccessful outcomes of this bridge can be due to biological causes such as caries or periodontal disease, mechanical causes such as deboning or fracture, or esthetic causes that may occur separately or in combination [11,12]. However, the high failure rates that are previously reported may be attributed to improper case selection, undesirable design, or inappropriate cementation protocol [10].

However, the success of RBBs is contingent on factors such as proper patient selection, maintenance, and careful consideration of the functional requirements of the specific case. Additionally, there are certain established standards related to the design and retainers of RBB for achieving clinical success of RBBs such as cantilever design, maximum enamel coverage by retainer, use of sandblasted and non-perforated retainers, use of nickel_ chrome alloy framework and none or minimal preparation with preservation of enamel thickness all will role play in successful of that treatment option with long survival rates. [3,4,10,11,13].

Some studies have also reported that retainer thickness, connector height, and the use of resin-based cement with rubber dam isolation are essential factors to minimize complications such as debonding, which is regarded as one of the most frequent complications of RBB. Despite this, accumulating scientific evidence indicates that they are effective alternatives to conventional bridges, and have been used to achieve long-term success and patient satisfaction [4,11,14,15]. Moreover, some systematic reviews approximate that 5-year survival rates of RBBs at 87.7%, in comparison with traditional bridges at just over 90% and 94.5% for implant-retained single crowns [16,17]. Similarly, a systematic review conducted by Balasubramaniam revealed that the predicted 5 -10 years' survival rates of RBBs are 83.6% and 64.9%, respectively [14]. Thoma et al. approximated that a 91.4% survival after 5 years and 82.9% after 10 years [18]. Survival rates vary between studies from 75-93% due to factors that affect success and variation in follow-up times [12,19,20]. Despite debonding issues, it is essential to understand that debonding may not be considered

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an absolute failure of the restoration, as function and aesthetics may be restored by a simple rebounding procedure [12,21]. The study aimed to evaluate the attitudes and awareness of dentists towards Resin-bonded bridges (RBB) in Benghazi.

Methods

The study employed a cross-sectional questionnaire survey to assess dentists' attitudes and awareness towards resin-bonded bridges in Benghazi in August 2024. The target population consisted of dentists registered with the Libyan Dental Syndicate practicing in Benghazi, Libya. The questionnaire, adapted from a validated instrument by Vohra et al. In 2014, Khan et al., in 2023 [2,12].

A structured questionnaire was created and administered via Google Forms. It included 21 closed-ended questions aimed at collecting information on demographics (age, gender, years of practice), professional qualifications (specialty), attitudes, and awareness of dentists towards resin-bonded bridges. The survey link was electronically distributed to a sample size of 200 dentists through the media. The Participants were informed about the study's purpose, the confidentiality of their responses, and their right to withdraw at any time. Data from the completed questionnaires were exported from Google Forms and analyzed using SPSS version 25.0.

Results

As shown in Table 1, the demographic profile of general dental practitioners and specialists in Benghazi who participated in the survey. The response rate of the survey was around 67%, the survey revealed a varied demographic among participants: 43.7% male and 56.3% female, mainly aged 21-30 years (58.3%) and 31-40 years (32.7%), with fewer participants aged 41-50 years (7.5%) and over 50 years (1.5%). In terms of experience, 26.6% had been practicing dentistry for less than 5 years, 65.3% for 5-10 years, and 8% for over 10 years of experience.

Table 1. Distribution of (age, gender, years of practicing, and specialty among participants

Variables	Class	Number	Percentage
Age	21-30	116	58.3%
	31-40	65	32.7%
	41-50	15	7.5%
	> 50	3	1.5%
Gender	Male	87	43.7%
	Female	112	56.3%
Years of practicing dentistry	Less than 5 years	53	26.6%
	5 -10 years	130	65.3%
	Over 10 years	16	8%
Specialty	Specialist (SPs)	97	48.5%
	GDP (General Dental Practitioner)	103	51.5%

Table 2 presents a detailed comparison between GDPs and specialists regarding various factors influencing the usage and longevity of resin-bonded bridges in dental practice. A notable observation is that both groups widely agree on the importance of certain factors, but specialists show higher adherence to best practices. For instance, both groups report relatively low usage of RBBs in tooth replacement cases (P=0.532). The survey found varied adoption rates of RBBs, with 83.8% of specialists and 88.1% of GDPs using them in less than 10% of tooth replacement cases. Respondents deemed RBBs mainly suitable for patients aged 6-18 years (76.2% of GDPs and 93.9% of specialists) and highlighted their role as provisional restorations (94.9% of specialists, 67.3% of GDPs). The primary perceived benefit was their conservative nature (70% of GDPs, 48.5% of specialists), although concerns about debonding (83.2% of GDPs and 98% of specialists) and the impact of remaining enamel on success rates were believed to be significant with both the general practitioners and specialists. Most respondents believed that retainer surface treatment improves RBB longevity, and 74% of general practitioners and 98% of specialists agreed that connector height affects RBB longevity, with a preference for 3 mm connectors in 56.4% of GPS and 67.7% of specialists. Regarding cement types, resin-based cement (RBC) was significantly preferred by 99% of specialists and 83% of GDPs over glass ionomer cement (GIC), which was chosen less frequently by only 1% of specialists and 16.8% of GDPs. Interestingly, the use of rubber dam isolation did not show a significant difference between the two groups (P = 0.133), with 91.9% of specialists and 85.1% of GDPs supporting its use. Lastly, the type of occlusion that leads to the most successful RBB outcomes is strongly favored by specialists, with 97% agreeing that Class I occlusion provides the best results, compared to 65.3% of GDPs. The data reflect a consistent pattern where specialists demonstrate a higher awareness of the technical factors that contribute to the success and longevity of RBBs compared to their GDP counterparts.

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Table 2. Numerical summary of participant responses to survey questions.

Question	Answer	GDP%	Specialists%	Chi-Square	P-value
What percentage of your tooth replacement cases have you employed RBBs?	<10%	88.1%	83.8%	1.263	0.532
	10-20%	9.9%	14.1%		
	21-30%	1%	2%		
What age group is indicated for the use of RBBs?	< 6	11.9%	3%	12.287	0.002
	6 - 18	76.2%	93.9%		
	>18	11.9%	3%		
What type of restoration do you consider RBBs provide?	Provisional	67.3%	94.9%	24.787	0.001
	Permanent	32.7%	5.1%		
what is the biggest advantage of RBBs?	Conservative	70.3%	48.5%	10.818	0.004
	Esthetic result	23.8%	45.5%		
	Supra gingival	5.9%	6.1%		
what is the biggest disadvantage of RBBs?	De-bonding	83.2%	98%	13.058	0.001
	Gingival grayness	11.9%	2%		
	Long edentulous	5%	0%		
does the amount of remaining enamel affect the success of RBBs?	Yes	79.2%	99%	19.984	0.001
	No	20.8%	1%		
How many missing teeth should be replaced for maximum longevity of RBB?	One	76.2%	98%	20.977	0.001
	Two	20.8%	2%		
	Three	3%	0%		
Which RBB retainer provides maximum longevity?	Perforated	63.4%	97%	36.278	0.001
	Non-perforated	15.8%	3%		
	Both	20.8%	0%		
Does retainer surface treatment increase RBB longevity?	Yes	82.2%	98%	13.87	0.001
	No	17.8%	2%		
Does connector height affect longevity?	Yes	74.3%	98%	23.368	0.001
	No	25.7%	2%		
What is the optimum height for a connector?	1m	11.9%	29.3%	32.057	0.001
	2m	26.7%	2%		
	3m	56.4%	67.7%		
	4m	5%	1%		
Does preparing teeth for retentive features improve longevity?	Yes	71.3%	97%	24.536	0.001
	No	28.7%	3%		
Which cement type provides maximum longevity?	RBC	83.2%	99%	15.281	0.001
	GIC	16.8%	1%		
Does the use of a rubber dam improve longevity?	Yes	85.1%	91.9%	2.252	0.133
	No	14.9%	8.1%		
Does the thickness of a retainer affect longevity?	Yes	69.3%	96%	24.599	0.001
	No	30.7%	4%		
What is the optimum thickness for a retainer?	0.3m	18.8%	46.5%	30.516	0.001
	0.5m	57.4%	51.5%		
	0.7m	18.8%	1%		
	1.0m	5%	1%		
Which type of occlusion are RBBs the most successful for?	no effect	26.7%	1%	33.682	0.001
	Class I	65.3%	97%		
	Class II	5.9%	2%		
	Class III	2%	0%		

Discussion

Recently, with an increasing emphasis on the conservation of oral tissues, awareness of RBBs as a definitive treatment option has increased. However, since their introduction, the main concern regarding RBBs has been the potential for higher debonding rates and decreased longevity. The goal was to identify barriers hindering the broader application of RBBs. RBBs offer a conservative and economical approach to replacing edentulous spaces. Key advantages of RBBs include preserving tooth and pulp vitality, minimal impact on surrounding tissues, a low risk of severe complications, the ability to easily adjust or remove the restoration, and unlike conventional bridges that require permanent tooth reduction [2,22].

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This study examined Benghazi dentists' attitudes and awareness towards resin-bonded bridges (RBBs) through a survey questionnaire. A survey of 200 dentists in Benghazi was conducted to explore prevailing attitudes and awareness concerning resin-bonded bridges (RBBs). The study achieved a substantial response rate of approximately 67% (48.5% of SPs and 51.5% of GPs), yielding a robust database representative of the local dental community. The demographic profile of participants indicated a preponderance of young dentists, primarily aged of participants aged between 21 and 40, with a balanced gender distribution. This suggests that the study findings may offer particular insights into the perspectives of early and mid-career dental professionals in Benghazi.

In the current study, RBBs are employed in less than 10% of tooth replacement cases by most surveyed dentists (88.1% of GPs and 83.8% of SPs) consistent with a study conducted by Vohra et al. a majority of 60% of SPs and 71% of GDPs used RBBs for less than 10% of the prosthodontic cases in their clinical practice [2]. A reduced level of self-confidence in performing these restorations and a sense of doubt regarding the longevity and durability of resin-bonded bridges (RBBs) were mentioned as rationales for the restricted application of RBBs. This finding explains why most of the participants in the current study (67.3% of GPs and 94.9% of SPs) consider the RBBs as a provisional treatment option and not as a definitive restoration.

As debonding is one of the most common concerns of RBBs and could adversely affect that treatment option [3,16]. In the present study, respondents identified debonding as the biggest disadvantage of RBBs (83.2% of GPs and 98% of SPs). The phenomenon of debonding continues to be regarded as the predominant cause of failure in resin-bonded bridges [16,22,23,24]. Except for 20.8% of GP participants, all subjects agreed about the role of remaining enamel in the success of RBBs, which is consistent with a study conducted in Saudi Arabia, where all respondents except 17.28% of GDP agreed that remaining tooth enamel affects the success of RBBs [2].

In the present survey, perforated RBBs were associated with greater success according to the opinion of the GP and SP groups (63.4% and 97%, respectively), which is in contrast with many other research reports [25,26]. Furthermore, a minimum retainer thickness of 0.7 mm and a minimum connector height of 2 mm has been recommended in previous studies [27,28,29].

Regarding the connector height, in the current study, 56.4% of GPs and 67.7% of SPs identified that 3mm is the optimum height, and 57.4% of GPs and 51.5% of SPs identified 0.5mm as the optimum thickness of the retainer. However, it has been shown that the lesser the thickness of a retainer, the greater the chance of a framework to flex and debond [27,28].

Several obstacles prevented RBBs from being widely used in clinical settings, including a perceived lack of dental skills and training, emphasizing the necessity for awareness through educational programs and practical RBB training. Additionally, insufficient technical support, procedural sensitivity, and the longevity of restorations further contributed to the limited use of RBBs. In previous studies, Key factors influencing the success of RBBs including, remaining enamel structure, number of the pontic, cement type, RBB design, and retainer surface treatment were considered very important factors for RBBs' success Some other factors also considered vital for their success such as proper case selection, materials selection, occlusal management, and periodontal considerations [2,3,27]. Furthermore, the analysis of survey data revealed a significant disparity in knowledge between specialists and GDPs in some aspects. Specialists demonstrated a higher level of awareness and understanding of key aspects of RBBs compared to GDPs. These findings highlight the broader and deeper knowledge base among specialists. Despite participants in the present study having a good understanding of the theoretical aspects of RBBs, their hesitation to use them in practice underscores the need for better clinical training for both GPs and SPs

This evidences also shed light on current practices and paves the way for future research and educational efforts to boost the use and understanding of RBBs among dentists in Benghazi. Grasping these details is key to enhancing clinical outcomes and patient care in dental fields like prosthodontics and restorative dentistry. It's recommended that qualitative studies be carried out to explore why dentists might lack confidence and to tackle the issues faculty face when teaching RBB techniques for everyday clinical practice.

Conclusion

To conclude, focusing specifically on Benghazi, Libya, specialists demonstrate a higher knowledge and awareness of RBBs than general dental practitioners (GDPs). While GDPs and SPs possess adequate theoretical knowledge, they exhibit reluctance to apply practical knowledge due to insufficient clinical experience. This outcome emphasizes a global necessity for tailored educational programs and hands-on training initiatives to bridge the gap between theoretical knowledge and clinical proficiency in utilizing RBBs. Such efforts empower dentists in Benghazi, improve patient outcomes, and broaden treatment options in restorative dentistry.

Conflict of interest.

The authors declare no conflict of interest

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