TPM Vol. 32, No. S5, 2025
ISSN: 1972-6325
https://www.tpmap.org/

KNOWLEDGE, ATTITUDE AND PRACTICE ABOUT THE USAGE OF INTERDENTAL AIDS AFTER CROWN PLACEMENT IN PATIENTS AMONG INTERNS OF PRIVATE DENTAL COLLEGES

ANJALI VIJAYAN
CRRI, TAGORE DENTAL COLLEGE AND HOSPITAL

TAMIZHESAI BALAVADIVEL
MDS, READER, DEPARTMENT OF PROSTHODONTICS AND CROWN AND BRIDGE, TAGORE DENTAL COLLEGE AND HOSPITAL

NAVIN BHARATHY
MDS, SENIOR LECTURER, DEPARTMENT OF PROSTHODONTICS AND CROWN AND BRIDGE, TAGORE DENTAL COLLEGE AND HOSPITAL

VENKATESHWARAN RAJENDRAN
MDS, PROFESSOR, DEPARTMENT OF PROSTHODONTICS AND CROWN AND BRIDGE, ASAN MEMORIAL DENTAL COLLEGE AND HOSPITAL

RAMYA DHANASEKARAN
MDS, READER, DEPARTMENT OF PROSTHODONTICS AND CROWN AND BRIDGE, SRI BALAJI DENTAL COLLEGE AND HOSPITAL

RATHINAVEL PANDIAN
MDS, READER, DEPARTMENT OF PROSTHODONTICS AND CROWN AND BRIDGE, TAGORE DENTAL COLLEGE AND HOSPITAL

SREENIDHI T
SAVEETHA MEDICAL COLLEGE, SAVEETHA INSTITUTE OF MEDICAL AND TECHNICAL SCIENCES

Abstract:

Objectives: The study aimed to evaluate the knowledge, attitudeand practice (KAP) regarding the usage of interdental aids following crown placement in patients among the dental students pursuing internships in Chennai.

Materials and methods: This cross-sectional survey was conducted among the interns in private dental colleges of Chennai by random sampling method. A validated, structured questionnaire consisting of 24 close-ended questions were circulated among the participants to evaluate the KAP about the usage of interdental aids following crown placement in patients. The descriptive statistical analysis was performed using SPSS software version 27.0.

Results: Among the 554study participants, 96.9% of the interns knew that interdental cleaning aids are used to remove debris and interproximal dental plaqueand 92.6% of interns are actively positive towards the importance of interdental cleaning for gingival and periodontal health. The study also concluded that 89.4 % of interns advise interdental cleaning to patients and 86.8% of interns take a history of personal oral care before prescribing interdental cleaning aids.

Conclusion: Most participants hadgood knowledge, positive attitude,andpractice on interdental oral hygiene. Thedentist must not only provide quality dental prostheses to the patients but also educate them to focus on the maintenance of these prostheses to improve their longevity.

Keywords: Attitude, Interdental aids, Knowledge, Practice, prosthesis, dental plaque

INTRODUCTION:

Fixed prosthodontic treatment is one of the best methods to replace missing teeth and root canal treated teeth; the prevalence of failures of such prosthesis is increased with its increased demand.[1] They are removed for several reasons, including secondary caries, severe gingival recession, or periodontal disease. The prime cause for these complaints is the accumulation of dental plaque due to inadequate maintenance. Even with a desirable pontic design and favourable material selection, oral hygiene measures are necessary for removing bacterial plaque and preventing mucosal inflammation.[2]It is a challenge to maintain the health of the existing oral structures with the new prosthesis, especially in the interdental areas,as they are more prone to plaque accumulation. This calls forthe need for interdentalaids along with daily tooth brushing. [3,4]A study conducted by Anjarlekaret al. revealed that the interproximal area is the most commonly involved surface in food impaction, followed by the area beneath the pontic.[5]The dentist must be well-informed about the benefit's interdental aids in order to effectively motivate patients to maintain good oral hygiene.

Dental students are seen as role models for promoting good oral health behaviour by their family, friends, and the public as they participate in dental community projects from different academic year levels. [6] Thus, measuring student's oral health knowledge and behaviourwill participate in revealing how much information they have and if exposing dental students to periodontal courses in the early academic levels is recommended.[7]

The dental literature has several articles on fixed partial denture, but only a few of them deal with the dentist's role in the failure of the prosthesis due to their negligence in motivating their patients to use interdental aids following crown placement. This is partly because of their limited knowledge regarding interdental cleaning aids. A study conducted by Lama et al. revealed that according to the patients, negligence of dentists to give post-cementation instructions was the most reported reason for not using special cleaning aids.[8] Moreover, patients with FPDs require regular, life-long professional maintenance, providing repeated oral hygiene interventionsand reinstructions regarding maintaining proper oral hygiene around fixed prostheses. In addition, the use of special aids such as electric toothbrushes, interdental brushes,and water flossers can improve the biological maintenance of fixed prostheses. [9-14]

Thus,this survey aimed to evaluate the knowledge, attitude, and practice regarding the usage of interdental aidsafter crown placementamong interns in private dental colleges.

MATERIALS AND METHODS:

A descriptivecross-sectional survey was conducted among 554internsin private dental colleges of Chennaiselected by random sampling method. The study was carried out for a period of two months, from February 2023 to April 2023. The ethical clearance was obtained from the Institutional Ethical Committee [IEC/TDCH/087/2022].

Before starting the study, the questionnaire was distributed among various subject experts to assess the validity of the questionnaire. Apilot survey was done to calculate the sample size.

The sample size was calculated using the formula:

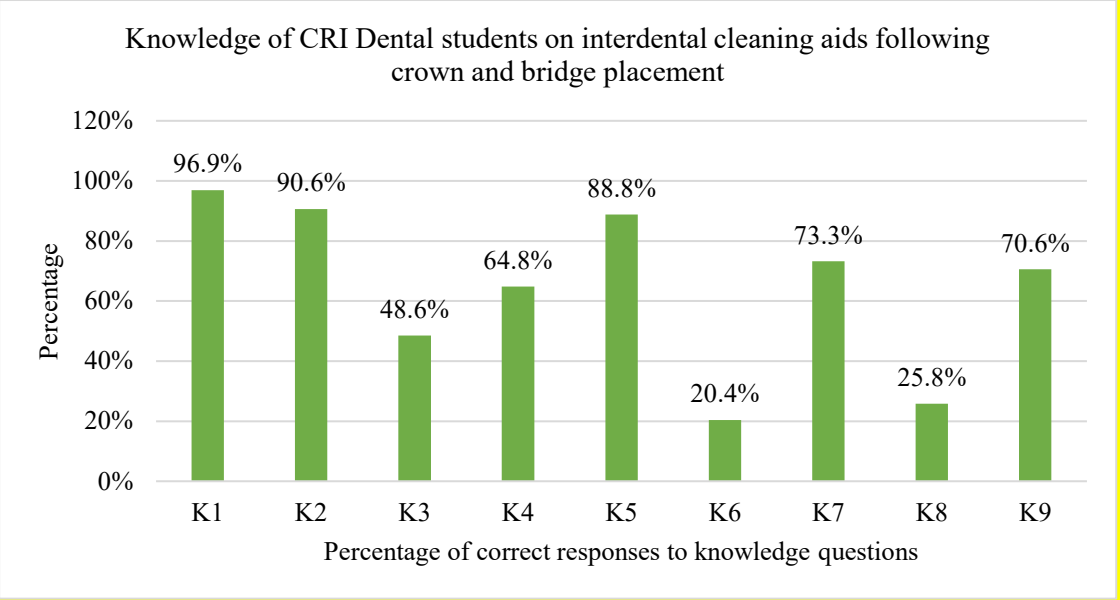
$$n = \frac{z^2PQ}{d^2}$$

Where Z= 1.96(level of confidence according to standard normal distribution), P= prevalence will be considered as 50% (0.50), Q= (1- P) = 100-50 = 50% (0.50), d = 0.05 (tolerated margin of error. After substituting the values required, the sample size was found to be 385.Finally, a total of 554 responses were received and considered for statistical analysis.

The study included CRI students, those present on the day of the study, and those who gave consent. Interns who were not present on the scheduled survey date or not agreeing to participate were excluded from the study. First, second, third and final year students were excluded from the study.Informed consent formsand a validated questionnaire wascirculated in the form of hard and soft copies (through google forms) depending on the participant's availability.Since the questionnaire did not contain the name, anonymity of prospective participants was maintained,and specific instructions were given on how to answer and return the completed forms. The questionnaire consisted of 24 close-ended questions to evaluate the KAP regarding interdental aids after crown placement to assess knowledge about gingivalembrasures, interdental cleaning aids, and methods of interdental cleaning. The attitude of the dentists toward the use of interdental aids was measured by a 5-point Likert scale of "agree," "strongly agree," "neutral," "disagree," and "strongly disagree" to indicate the degree of agreement with the essentiality of maintaining good interdental hygiene, compliance in the use of interdental aids and regarding motivating the patients on the usage of interdental aids.The questionnaire also included questions that measured the practices being followed by the respondents themselves in the use of interdental aids and their recommendations to patients. The subjects responded to each questionaccording to the response format provided. Thecompleted questionnaire was collected on the same day, and the data were tabulated in Microsoft Excel and analysed using SPSS software version 27.0.

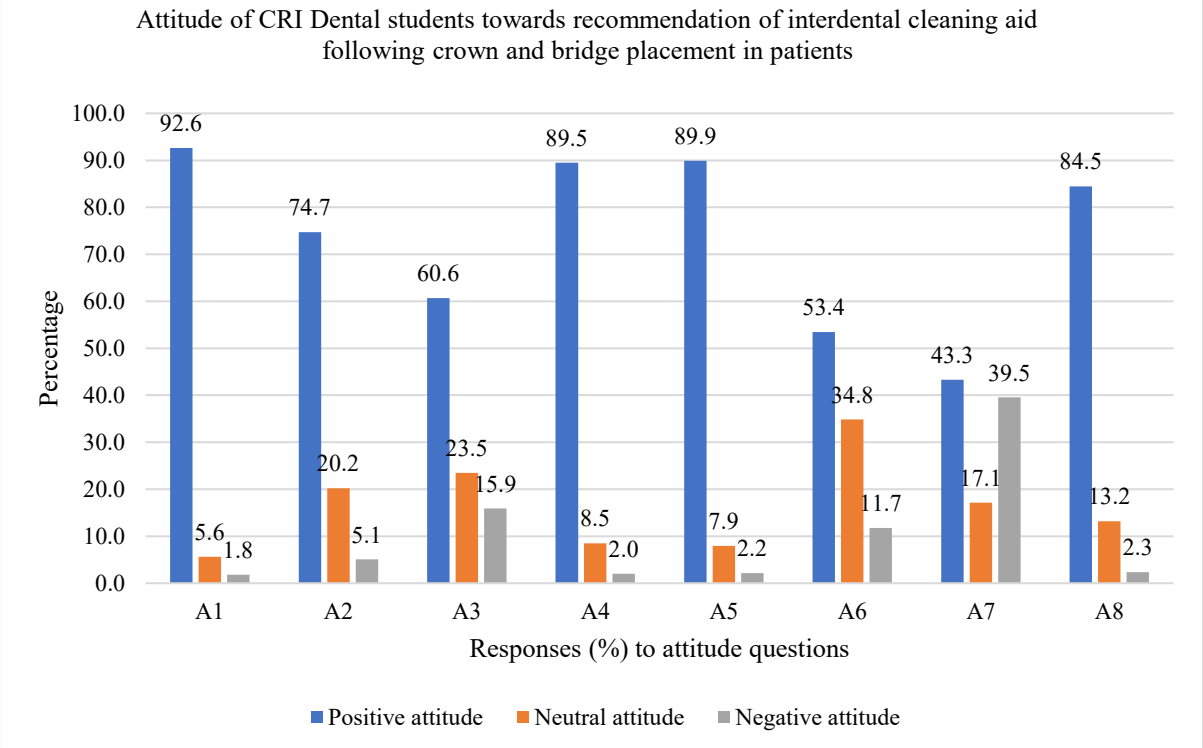
Results:

Graph 1: Knowledge of CRI Dental students on interdental cleaning aids following crown and bridge placement in patients



Graph 1 shows that among the study participants, 96.9% of the interns knew that interdental cleaning aids removes debris and interproximal dental plaque,90.6% knew that interdental cleaning after crown placement help in improving gingival health,88.8% knew the specific sizes of interdental brushes based on the available interdental gap,73.3% knew the different methods of dental flossing and 70.6% knew about the function of oral irrigators.

Graph 2: Attitude of CRI Dental students on recommending interdental cleaning aids following crown and bridge placement in patients



Graph 2 shows that 92.6% of interns have a positive attitude towards importance of interdental cleaning for gingival and periodontal health,89.9 % of interns have a positive attitude towards the maintenance of good interdental hygiene to prevent gingival infection, 89.5 % have a positive attitude regarding the maintenance of

good interdental hygiene to avoid gingival infection,74.7% participants think that there is patient compliance in the use of interdental aids.

Table 1: Practice of dentalCRI students on recommending interdental cleaning aids following crown and bridge placement in patients

Practice questions	Options	N	%
P1	a. Only Brush	280	50.5
	b. Brush and interdental aids	274	49.5
P2	a. Yes	495	89.4
	b. No	59	10.6
P3	a. Always	291	52.5
	b. If there is food lodgement	246	44.4
	c. Never	17	3.1
P4	a. Yes	261	47.1
	b. No	293	52.9
P5	a. Yes	481	86.8
	b. No	73	13.2
P6	a. Yes	366	66.1
	b. No	188	33.9
P7	a. Yes	507	91.5
	b. No	47	8.5

Table 1 shows that 89.4 % of interns advise interdental cleaning to patients, 86.8% of interns take a history of personal oral care before prescribing interdental cleaning aids and 66.1% of interns use disclosing agent to record the plaque score before prescribing an interdental cleaning aid.

DISCUSSION

Periodontitis is a multifactorial disease[14] with risk factors such as diabetes mellitus (DM), smoking andmost commonly,poor oral hygiene (OH).[16]Inadequate tooth brushing and lack of interdental cleaninglead to the build-up of dental plaque, which contain microorganisms that can initiate and sustainchronic gingivitis and chronic periodontitis.[17]According to Lertpimonchaiet al., poor oral hygiene increases the risk of periodontitis by approximately two- to five-fold compared with good oral hygiene.[18] Chronic periodontitis is condition that results in the loss of the gingiva, bone and ligament which can eventually lead to tooth loss.[19]The treatment of choice for the replacement of missing teeth is fixed partial denture. This requires a meticulous hygiene regime,[3,10,11] the lack of which can lead to gingival disease and periodontal inflammation resulting in the failure of the prosthesis.Clinically, gingivitis and periodontitis are usually more pronounced in interproximal areas than facial aspects,[20] interproximal surfaces being the predominant sites of residual plaque. [20,21] Optimum plaque control cannot be achieved with brushing alone; hence, there is a need for adjunctive interdental cleaning aids [22] such as electric toothbrushes, interdental brushes, and water flossers.

A study by Lama et al.reported that themajority of the patients were not informed by their dentists the importance of the special dental aids to maintain healthy tissue underneath the prosthesis, and this was the most reported reason for not using special cleaning aids. A significantly higher percentage of patients who received instructions from their dentists used special aids than those who did not.[8]Dentists are obliged toprovide patients with adequate oral hygiene instructions and to reinforce these instructions on a periodic basis.

In lieu of the above, the current study aimed to present a comprehensive review of the knowledge, attitude, and practice of interdental aids after crown placement in patients among dental interns.

The knowledge of the surveyed candidates was high regarding the uses of interdental cleaning (96.9%), the effects of interdental cleaning (90.6%), different methods of dental flossing (73.3%), and the function of oral irrigators (70.6%). Improvement in knowledge is needed regarding specific interdental cleaning methods recommended for available interdental spaces (64.8%), types of embrasures present (48.6%), special floss used for cleaning braces and bridges (25.8%), and uses of monofilament floss over multifilament floss (20.4%). Knowledge and understanding regarding interdental aids areessential requirements for dentists, which influences their attitude and practice in using them.

A study conducted by Crocombe et al. indicated that regular self-interdental cleaning was associated with lower levels of dental plaque, dental calculus, and gingivitis. [23] In the present study, the higher percentage of students have a positive attitude towards the importance of interdental cleaning for good gingival and periodontal health (92.6%), maintenance of good interdental hygiene to prevent gingival infection (89.9%), motivation of patients to use interdental cleaning aids (89.5%), selection of appropriate interdental cleaning aids (84.5%) and regarding

patient compliance in the use of interdental aids (74.7%). Even though 92.6% of the surveyed students strongly agree on the importance of interdental cleaning for gingival and periodontal health, 43.3% of students agree that tooth brushing alone is sufficient for plaque removal from proximal tooth surfaces, and only 53.4% of the interns prescribe tufted dental floss for the distal and mesial surface of the crown. Awareness through clinical trials should be reinforced in students to bring about the positive attitude towards the usage of interdental aids.

A study by Elsabagh et al. reported; that only 36% of students used a brush and dental floss for tooth cleaning. [24] In the current study, 50.5% of interns use only brush for cleaning their teeth, and 49.5% use both brush and interdental aids for cleaning their teeth. The differencein the oral lifestyle may be due to difference in the socio-demographic characteristics of the studies.

A study by Geiballa et al. showed that 94% of the patients were not using dental aids to clean their fixed prostheses while only 6% were using dental aids. The reason mostpatients did not use dental aids was because the dentist did not inform them. [4]The present study shows that 89.4% of interns advise interdental cleaning to their patient from which 44.4% prescribe interdental cleaning only if there is food lodgement. The study found out that the participants were hesitant tonormalize interdental cleaning as a routine hygiene regimen along with tooth brushing, necessitating reinforcement programs for dental students regarding importance of changing the knowledge into practice.

The study reported that 86.8% of interns take a history of personal oral care before prescribing interdental cleaning aids and66.1% of interns use disclosing agents to record the plaque score before prescribing an interdental cleaning aid. The prevalence was found to be lower in a study done by Giannissah Fathina Fairuz et al. which showed that only 42% of dentists had a high level of knowledge, and only half of the participating dentists were aware of the importance of using disclosing agents at home and in dental practice.[25]

A case was reported by Walters and Chang reported in which improper brushing and flossing habits were associated with tooth abrasion, gingival recession, gingival clefting, and localized periodontal bone loss, where floss-induced injuries were more severe than tooth brushing.[26] The present study reported that 47.1% of interns came across floss cuts in their practice.Although the improper flossing method can lead to injuries to the gingiva, the benefits associated with appropriate flossing technique outweigh the risk of damage. Toothbrushing when used as a monotherapy for the control of dental biofilmis not effective in preventing diseases of the teeth and their supporting tissues. [27,28] Control of interproximal biofilm formation requiresinterdental oral hygiene aid, one such aid being dental floss. Although these aids are not as big as a toothbrush, they have a big role in preventing the initiation of gingivitis in the interdental areas. [29]

Though the sample is a non-representative of the total population of dentists, it gives an understanding of the importance of interdental aids to the general population.

The advantage of the study is that it targeted interns to be the most appropriate for procuring information about the awareness of interdental aids as they disclose information about what they learned in their dental curriculum and what kind of attitude they have acquired, which will eventually reflect in their practice.

The limitation of the study was that the sample population was restricted to interns of private dental colleges therefore, the results cannot be generalized to the whole dentist population. The survey was conducted only in a particular region; hence there can be a bias due to the difference in the sociodemographic characteristics and the difference in the oral lifestyle.The data was collected through questionnaire; hence the results could be biased as the participants tend to give desirable responses which can affect the accuracy of the results.

Future studies should include a larger sample size for a more diverse study population. This study can be used as a valuable reference tool in the future to evaluate the effectiveness of reinforcement programs in the dental curriculum.

CONCLUSION:

Continuing health education programs regarding inter-dental aids are essential to ensure that adequate awareness and training are given at the undergraduate level. There are many different types of oral cleaning aids available in the market and it is difficult to decide which one is best therefore, it is important for dentists to take the decision on what is best for their patients based on the specific situations. Dentists are important allies in the fight against caries and periodontal diseases, and their advice can help patients achieve their oral health goals.

Funding: The research did not receive any funding.

Conflict of interest: No conflicts of interest

REFERENCES:

1. Simpson RL. Failures in crown and bridge prosthodontics. The Journal of the American Dental Association. 1953 Aug 1;47(2):154-9.
2. Tolboe H, Isidor F, Budtz-Jörgensen E, Kaaber S. Influence of oral hygiene on the mucosal conditions beneath bridge pontics. Scand J Dent Res.1987 Dec;95(6):475-82.
3. Bidra AS, Daubert DM, Garcia LT, Gauthier MF, Kosinski TF, Nenn CA, et al. Systematic Review of Recall Regimen and Maintenance Regimen of Patients with Dental Restorations. Part 1: Tooth-Borne Restorations. J Prosthodont. 2016 Jan;25 Suppl 1:S2-15.
4. Geiballa GH, Abubakr NH, Ibrahim YE. Patients' satisfaction and maintenance of fixed partial denture. Eur J Dent. 2016 Apr-Jun;10(2):250-253.
5. Nagarsekar A, Gaunkar R, Aras M. Knowledge, attitude, and practice of dental professionals regarding the effect and management of food impaction associated with fixed partial denture prostheses: A survey. J Indian Prosthodont Soc. 2016 Oct-Dec;16(4):372-379.
6. Singh S, Pottapinjara S. Dental undergraduate students' knowledge, attitudes and practices in oral health self-care: A survey from a South African university. Afr J Health Prof Educ 2017; 9:2.
7. www.efp.org/publications-education/undergraduate-education/
8. Alqabbaa, Lama & Rayyan, MohammadR. Oral hygiene and maintenance habits among fixed partial denture wearers. Saudi Journal of Oral Sciences;5(2):115.
9. Kc Basnyat S, Sapkota B, Shrestha S. Oral Hygiene and Gingival Health in Patients with Fixed Prosthodontic Appliances - A Six Month Follow-up. Kathmandu Univ Med J (KUMJ). 2015 Oct-Dec;13(52):328-32.
10. Jackson MA, Kellett M, Worthington HV, Clerehugh V. Comparison of interdental cleaning methods: a randomized controlled trial. J Periodontol. 2006Aug;77(8):1421-9.
11. Kiger RD, Nylund K, Feller RP. A comparison of proximal plaque removal using floss and interdental brushes. J Clin Periodontol. 1991 Oct;18(9):681-4.
12. Nayak RP, Wade AB. The relative effectiveness of plaque removal by the Proxabrush and rubber cone stimulator. J Clin Periodontol. 1977 May;4(2):128-33.
13. Rosema NA, Hennequin-Hoenderdos NL, Berchier CE, Slot DE, Lyle DM, van der Weijden GA. The effect of different interdental cleaning devices on gingival bleeding. J IntAcadPeriodontol. 2011 Jan;13(1):2-10.
14. Waerhaug J. The interdental brush and its place in operative and crown and bridge dentistry. J Oral Rehabil. 1976 Apr;3(2):107-13.
15. Van Dyke TE, Sheilesh D. Risk factors for periodontitis. J IntAcadPeriodontol. 2005 Jan;7(1):3-7.
16. Bashar Bakdash . Oral Hygiene and Compliance as Risk Factors in Periodontitis. J Periodontol. 1994 May;65 Suppl 5S:539-44.
17. Darveau, R. P. Periodontitis: a polymicrobial disruption of host homeostasis. Nat. Rev. Microbiol. 2010 Jul;8(7):481-90.
18. Lertpimonchai A, Rattanasiri S, Arj-Ong Vallibhakara S, Attia J, Thakkinstian A. The association between oral hygiene and periodontitis: a systematic review and meta-analysis. Int Dent J. 2017 Dec;67(6):332-43.
19. Kinane DF, Stathopoulou PG, Papapanou PN. Periodontal diseases. Nat Rev Dis Primers. 2017 Jun 22;3:17038.
20. Löe H. Mechanical and chemical control of dental plaque. J Clin Periodontol. 1979 Dec;6(7):32-6.
21. Claydon NC. Current concepts in toothbrushing and interdental cleaning. Periodontol 2000. 2008; 48:10-22
22. Ng E, Lim LP. An Overview of Different Interdental Cleaning Aids and Their Effectiveness. Dent J (Basel). 2019 Jun;7(2):56.
23. Crocombe LA, Brennan DS, Slade GD, Loc DO. Is self interdental cleaning associated with dental plaque levels, dental calculus, gingivitis and periodontal disease?
J Periodontal Res. 2012 Apr;47(2):188-97.
24. Elsabagh, Hala. Oral hygiene knowledge, attitude, practice and self-perception of personal dental appearance among majmaah university female student, KSA.Journal of Public Health.2018 Jan;1(1):14-18.
25. Fairuz, Giannissah&Sopiatin, Siti&Amaliya, Amaliya. Knowledge, Attitude, Practice Towards Plaque Disclosing Agent Among Dentists in West Java, Indonesia. Journal of International Dental and Medical Research.2022 Jan;14(4):1552-60.
26. Walters JD, Chang EI. Periodontal bone loss associated with an improper flossing technique: a case report. Int J Dent Hyg. 2003 May;1(2):115-9.
27. Bergenholtz A, Brithon J. Plaque removal by dental floss or toothpicks. An intra-individual comparative study. J Clin Periodontol. 1980 Dec;7(6):516-24.
28. Carter-Hanson C, Gadbury-Amyot C, Killoy W. Comparison of the plaque removal efficacy of a new flossing aid (Quik Floss) to finger flossing. J Clin Periodontol. 1996 Sep;23(9):873-8.