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**Original Research Article**

# Knowledge and attitude of dental students in treating patients on antiplatelet and/ or anticoagulant medications

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## ABSTRACT

**Background:** Antiplatelet and anticoagulant medications are widely prescribed for the prevention of thromboembolic events. Dental management of patients taking such medications can be troublesome because of the possibility of excessive bleeding during surgical procedures. On the other hand, stopping these medications will increase the risk of thromboembolic complications. This study aimed to evaluate the level of knowledge and attitude of dental students and internship trainees at King Saud university in treating patients on antiplatelet and/or anticoagulant medications.
**Methods:** A 17-question survey was distributed among dental students in third, fourth, and fifth (seniors) academic year levels, as well as internship trainees. The survey included questions aiming to evaluate participants' knowledge in treating patients on antiplatelet and/or anticoagulant medications. A total of 281 surveys were returned complete.
**Results:** In our study, most participants were aware of aspirin (86.1%) and warfarin (92.2%) but only a few were aware of newer medications like rivaroxaban (10.7%) or apixaban (8.2%). The majority of participants would consult with the patient's physician (76.9%) before stopping any medications and/or would rely on local hemostatic techniques to control bleeding (70.8%).
**Conclusions:** In this study, we concluded that only a small percentage of participants were aware of and following the latest guidelines. The findings of the present study suggest a need for educational programs and workshops regarding this topic.

**Keywords:** Antiplatelet, Anticoagulant medications, Aspirin, Heparin, Tooth extraction

## INTRODUCTION

Oral Antiplatelet and anticoagulant medications are commonly prescribed for primary and secondary prevention of thromboembolic events, including deep venous thromboembolism, congestive heart failure, ischemic heart disease, and stroke.[1,2] While antiplatelet and anticoagulant medications offer protection against thromboembolic events, their major undesirable side effect is prolonged bleeding after a surgical procedure.[3-5] The dental management of patients on antiplatelet and/or anticoagulant medications still faces uncertainty by medical and dental professionals. The controversy is whether the medications should be stopped before dental procedures or be uninterrupted.[6,7] Those in favor of discontinuing the medications argue that the patient is at risk of bleeding and hemorrhage, while those who support continuing the medication argue that the risk of thromboembolism is greater than the risk of bleeding.[5]

Currently, most dental and medical organizations recommend continued antiplatelet and anticoagulant therapy for patients undergoing minor oral surgeries such as tooth extraction and resort to local hemostatic agents to control bleeding.[8,9] However, dental and medical professionals, including dental students, still struggle to adapt to the recent recommendations and guidelines and vary widely in their practice.[10] Hence, the present study

aims to evaluate and assess the level of knowledge and attitude of dental students in third, fourth, and fifth (seniors) academic year level, as well as internship trainees of both genders attending King Saud university in treating patients on antiplatelet and/or anticoagulant medications. We also aim to compare their practice to the latest guidelines, determine the efficacy of the present undergraduate dental curriculum, and to assess the need for additional training in the topic of coagulation.

## METHODS

This study was approved by the ethical committee of King Saud university. Descriptive and inferential statistical analysis of responses collected from a 17-question survey distributed to all third, fourth, and fifth (seniors) year dental students, as well as internship trainees of both genders attending King Saud university, Riyadh, Saudi Arabia from June 2020 to September 2020, was done. First and second year students were not included in the study as well as students and internship trainees from other universities and colleges. The survey was formulated by the authors of this paper with some questions modified from other similar studies.[11,12] The survey was evaluated by a maxillofacial surgeon for validity and distributed to a small number of students to ensure the clarity of the survey. The first part of the survey contained demographic data questions, including gender and academic year. The second part contained questions aiming to evaluate the knowledge and attitude of dental students and internship trainees regarding the treatment of patients on antiplatelet and/or anticoagulant medications. A total of 281 surveys were completed and returned by participants. Statistical package for social sciences (SPSS version 20) was used for data entry and analysis. Chi-square analysis and post hoc test were used for inferential statistics.

## RESULTS

The aim of this study was to assess and measure the level of knowledge and awareness of 3rd, 4th, 5th (seniors) dental students and internship trainees of both genders attending the college of dentistry at King Saud university in treating patients on antiplatelet and/or anticoagulant medications. Total of 388 questionnaires were distributed and 281 were returned complete (response rate of 72.4%), 166 of the participants were females (59.1%) and 115 were males (40.9%) (Table 1). Of those, 109 were third-year dental students (38.8%), 96 were fourth-year dental students (34.2%), 29 were fifth-year dental students (10.3%), and 47 were dental interns (16.7%) (Table 1).

The majority (44.8%) of the participants reported that they encounter patients on antiplatelet and/or anticoagulant medications a few times a year, 15.7% reported that they come across such cases monthly, and 28.5% reported that they have never encountered patients on antiplatelet and/or anticoagulant medications (Table 2). Most (89%) of the participants agreed that antiplatelet and anticoagulant medications are prescribed for cardiovascular disorders, primary prophylaxis against thromboembolism (65.5%), and cerebrovascular disorders (36.7%) (Table 2). The majority (72.6%) of participants would consult a cardiologist before treating patients on antiplatelet or anticoagulant medications, 38.4% would consult a primary care physician, and 36.3% would consult a maxillofacial surgeon (Table 2). The majority (94%) of participants thought that antiplatelet and anticoagulant medications should be stopped for major surgeries like orthognathic surgeries, 52% thought the medications should be stopped for minor surgeries like single tooth extraction, and 20.3% said the medications should be stopped for scaling and root planing (Table 2). The majority of participants were aware of warfarin (92.9%), aspirin (86.1%), and heparin (83.6%) (Table 2). Few of the participants were aware of direct-acting anticoagulants such as rivaroxaban (10.7%) and apixaban (8.9%) (Table 2). Most of the participants recognized aspirin as an antiplatelet (76.9%), warfarin (74.7%), and heparin (65.8%) as anticoagulants (Table 2).

**Table 1: Demographic characteristics of study participants.**

| Variables | Options | N (281) | Percentages (%) |
|---|---|---|---|
| **Gender** | Female | 166 | 59.1 |
| | Male | 115 | 40.9 |
| **Academic year** | 3rd year | 109 | 38.8 |
| | 4th year | 96 | 34.2 |
| | 5th year | 29 | 10.3 |
| | Intern | 47 | 16.7 |

When participants were asked which medication is monitored through international normalized ratio (INR), most participants knew that warfarin is monitored through INR (65.5%) (Figure 1). Chi-square analysis revealed a significant ($p<0.005$) association between academic year and respondents' answer. The majority of fourth-year (90.6%), fifth-year (75.9%), and dental interns (89.4%) answered correctly, while the majority of third-year students (69.7%) answered incorrectly (Figure 1).

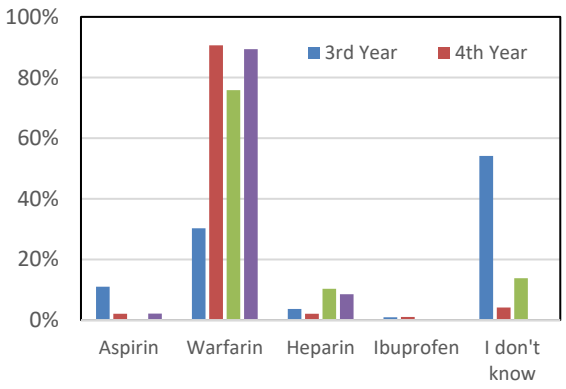


**Figure 1: Participants' responses regarding medications monitored with INR. Participants were able to choose multiple responses.**

**Table 2: Participants' responses regarding questions about their knowledge and attitude in treating patients on antiplatelet and/or anticoagulant medications.**

| Questions | Options | N | Percent (%) |
|---|---|---|---|
| **How often do you encounter patients on antiplatelet and/or anticoagulant medications?** | Daily | 3 | 1.1 |
| | Weekly | 28 | 10 |
| | Monthly | 44 | 15.7 |
| | Few times a year | 126 | 44.8 |
| | Never | 80 | 28.5 |
| **What do you think antiplatelet or anticoagulant medications are usually prescribed for? (Multiple answers possible)** | Cardiovascular disorders | 250 | 89.0 |
| | Cerebrovascular disorders | 103 | 36.7 |
| | Primary prophylaxis against thromboembolism | 184 | 65.5 |
| | Before major surgeries | 45 | 16.0 |
| | I don't know | 5 | 1.8 |
| **Who would you consult before treating patients on antiplatelet and/or anticoagulant medications? (Multiple answers possible)** | Cardiologist | 204 | 72.6 |
| | Primary care physician | 108 | 38.4 |
| | Maxillofacial surgeon | 102 | 36.3 |
| | Colleague | 18 | 6.4 |
| | I wouldn't consult anyone | 4 | 1.4 |
| | I don't know | 10 | 3.6 |
| **For what procedure do you think antiplatelet or anticoagulant medications should be stopped? (Multiple answers possible)** | Simple restorative procedures | 4 | 1.4 |
| | Minor surgical procedures (e.g., extraction, implant placement) | 146 | 52 |
| | Major surgical procedures (e.g., orthognathic surgeries) | 261 | 92.9 |
| | Endodontic procedures | 31 | 11.0 |
| | Scaling and root planning | 57 | 20.3 |
| | None of the above | 7 | 2.5 |
| | I don't know | 3 | 1.1 |
| **What antiplatelet or anticoagulant medications are you aware of? (Multiple answers possible)** | Aspirin | 242 | 86.1 |
| | Dipyridamole | 20 | 7.1 |
| | Clopidogrel | 58 | 20.6 |
| | Warfarin | 261 | 92.9 |
| | Heparin | 235 | 83.6 |
| | Ibuprofen | 82 | 29.2 |
| | Rivaroxaban | 30 | 10.7 |
| | Apixaban | 23 | 8.2 |
| | I'm not aware of any medications | 3 | 1.1 |
| **Which of the following are antiplatelet medications? (Multiple answers possible)** | Aspirin | 216 | 76.9 |
| | Dipyridamole | 26 | 9.3 |
| | Clopidogrel | 51 | 18.1 |
| | Warfarin | 37 | 13.2 |
| | Heparin | 33 | 11.7 |
| | Ibuprofen | 25 | 8.9 |
| | Rivaroxaban | 6 | 2.1 |
| | Apixaban | 4 | 1.4 |
| | I don't know | 35 | 12.5 |
| **Which of the following are anticoagulant medications? (Multiple answers possible)** | Aspirin | 44 | 15.7 |
| | Dipyridamole | 12 | 4.3 |
| | Clopidogrel | 20 | 7.1 |
| | Warfarin | 210 | 74.7 |
| | Heparin | 185 | 65.8 |
| | Ibuprofen | 23 | 8.2 |
| | Rivaroxaban | 41 | 14.6 |
| | Apixaban | 31 | 11 |
| | I don't know | 30 | 10.7 |

Continued.

| Questions | Options | N | Percent (%) |
|---|---|---|---|
| **Which of the following are direct-acting oral anticoagulant? (Multiple answers possible)** | Aspirin | 46 | 16.4 |
| | Dipyridamole | 1 | 0.4 |
| | Clopidogrel | 4 | 1.4 |
| | Warfarin | 54 | 19.2 |
| | Heparin | 23 | 8.2 |
| | Ibuprofen | 6 | 2.1 |
| | Rivaroxaban | 17 | 6 |
| | Apixaban | 12 | 4.3 |
| | I don't know | 157 | 55.9 |
| **What is the minimum platelet count to perform extraction safely? (µL)** | 30,000 | 13 | 4.6 |
| | 50,000 | 104 | 37.0 |
| | 70,000 | 19 | 6.8 |
| | 100,000 | 45 | 16.0 |
| | I don't know | 100 | 35.6 |
| **Do you think you need more training in treating patients on antiplatelet and/or anticoagulant medications?** | Yes | 271 | 96.4 |
| | No | 10 | 3.6 |

When asked about the consequence of stopping antiplatelet and/or anticoagulant medications, a significant difference ($p<0.005$) was observed between the academic years. A little more than half (58%) of the participants were aware that stopping antiplatelet and/or anticoagulant medications can lead to thromboembolic complications (Figure 2).

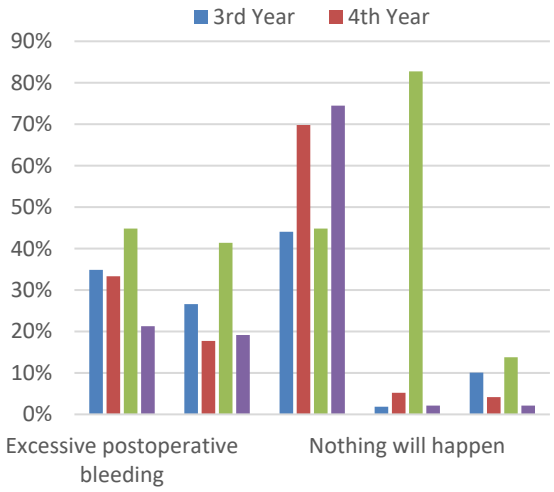


**Figure 2: Participants' responses regarding complications of stopping antiplatelet and/or anticoagulant medications. Participants were able to choose multiple responses.**

When the participants were asked how they would differ the treatment for patients on antiplatelet and/ or anticoagulant medications, most participants said they would stop the medications after consultation (76.9%) or would use local hemostatic agents to control bleeding (70.8%), 60.9% answered both (Figure 3).

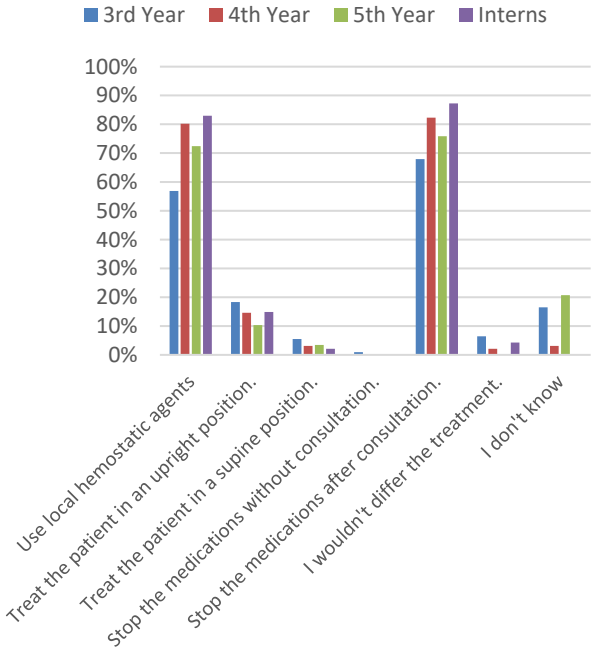


**Figure 3: Participants' responses on how they would differ the treatment for patients on antiplatelet and/or anticoagulant medications. Participants were able to choose multiple responses.**

A significant difference ($p<0.005$) was observed between third-year students and the other academic years. A significant difference ($p<0.005$) existed between the groups when asked about their awareness of medications that can potentiate the effect of antiplatelets and anticoagulants. Around half (54.4%) were aware that nonsteroidal anti-inflammatory drugs (NSAIDs) can potentiate the effect of antiplatelets and anticoagulants, while 45.6% did not know what medications can potentiate effect of antiplatelets or anticoagulants (Figure 4).

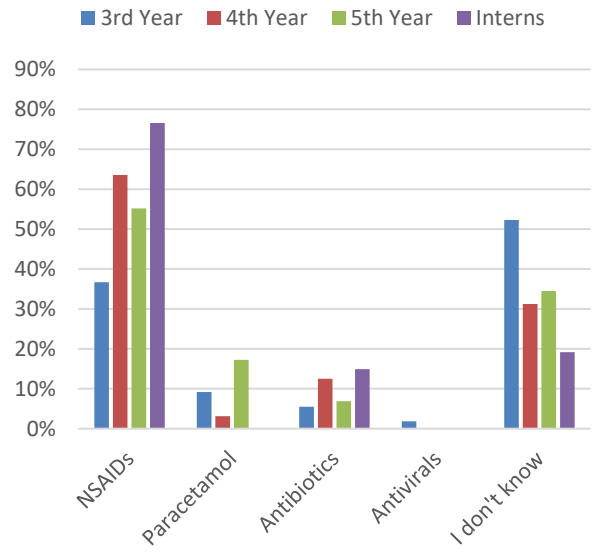


**Figure 4: Participants' responses regarding medications can potentiate the effect of antiplatelets or anticoagulants. Participants were able to choose multiple responses.**

When asked about the maximum INR to perform extraction safely, 49.5% were aware of the 3.5 INR limit, with a significant difference ($p<0.005$) between the groups (Figure 5).

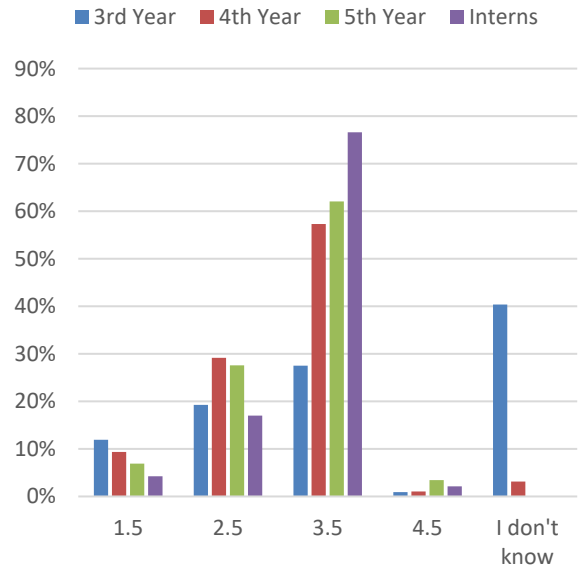


**Figure 5: Participants' responses regarding the INR limit to perform extraction safely.**

When asked about the minimum platelet count to perform extraction safely, only 37% chose 50,000/µL with no significant difference between the groups (Table 2). When participants were asked if they need more training in treating patients on antiplatelet and/or anticoagulant medications, 96.4% answered yes (Table 2).

## DISCUSSION

In this study, we aimed to assess the level of knowledge and awareness of third, fourth, fifth (seniors) dental students and internship trainees of both genders attending the college of dentistry at King Saud University in treating patients on antiplatelet and/or anticoagulant medications. Antiplatelet and anticoagulant medications are prescribed as prophylaxis and treatment of cardiovascular and cerebrovascular disorders.[13] Patients on antiplatelet and/or anticoagulant medications are at risk of bleeding during surgical procedures. Current evidence suggests that the risk of thromboembolism outweighs the risk of hemorrhage and that bleeding during minor surgical procedures can be managed using local hemostatic agents.[14–17] The results of the present study clearly indicate that the majority of dental students and interns are not knowledgeable about the topic of antiplatelets and anticoagulants or the clinical management of patients taking such medications despite the availability of guidelines on this topic. Warfarin is a commonly used anticoagulant medication that is monitored through INR.[18] The majority (65.5%) of the participants of this study were aware that warfarin is monitored with INR. A systematic review by Madrid et al concluded that the decision to stop or continue the medications depends on the individual's risk for bleeding and thromboembolism.[19] More than half (58%) of the participants in our study were concerned about the risk of thromboembolism if the medication is stopped while a similar number (56.9%) thought that stopping the medication would lead to excessive bleeding. In our study, the majority (60.9%) of participants would use local hemostatic techniques to control hemorrhage and/or stop the medication after consultation with the patient's physician. This is in accordance with a study on German dentists conducted by Ringel and Maas and a study in Saudi Arabia conducted by Doumani et al on dental interns.[20,21] Also, the majority (70.8%) of participants would use local hemostatic agents if stopping the medications is not possible, which is in accordance with current recommendations.[8,22] A little more than half (54.4%) of the participants knew about the drug-drug interaction between antiplatelet and/or anticoagulant medications and NSAIDs. This is in accordance with a study conducted by Kumar on Indian dental students and internship trainees.[12] Current evidence suggests that extractions can be performed safely with an INR of less than 4.[23,24] In our study, only around half (49.5%) of participants were aware of the current guidelines. Currently, the guidelines indicate a 50,000/µL platelet count limit for dental extractions.[25] Only 37% of participants were aware of the current recommendation. In our study, almost all (96.4%) participants agreed that they need more education and training to manage patients on antiplatelet and/or anticoagulant medications. There were few limitations in the present study. The participants were from only one dental college in Saudi Arabia. Also, the smaller number of final year students and internship trainees compared to third-and fourth-year students.

Finally, the present study did not rely on any index to assess the knowledge of the participants.

## CONCLUSION

In this study, we concluded that only a small percentage of participants were aware of and following the latest guidelines. The findings of the present study confirm a lack of knowledge and awareness of dental students and internship trainees about antiplatelet and anticoagulant medications and suggest a need for educational programs and workshops regarding this topic to educate students and improve their practice in treating patients taking antiplatelet and/or anticoagulant medications.

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*Ethical approval: The study was approved by the Institutional Ethics Committee*

## REFERENCES

1. Aframian DJ, Lalla RV, Peterson DE. Management of dental patients taking common hemostasis-altering medications. Oral Surgery, Oral Med Oral Pathol Oral Radiol Endodontol. 2007;103:S45.e1.
2. Al-Mubarak S, Al-Ali N, Rass MA, Al-Sohail A, Robert A, Al-Zoman K, Al-Suwyed A, Ciancio S. Evaluation of dental extractions, suturing and INR on postoperative bleeding of patients maintained on oral anticoagulant therapy. Br Dent J. 2007;203(7):E15.
3. Balevi B. Should warfarin be discontinued before a dental extraction? A decision-tree analysis. Oral Surgery, Oral Med Oral Pathol Oral Radiol Endodontol. 2010;110(6):691-7.
4. Belov I V, Vinokurov IA. Anticoagulants in surgical practice. Khirurgiia (Mosk) 2013;45(5):45-8.
5. Brewer AK. Continuing warfarin therapy does not increased risk of bleeding for patients undergoing minor dental procedures. Evid Based Dent. 2009;10(2):52.
6. Campbell JH, Alvarado F, Murray RA. Anticoagulation and minor oral surgery: Should the anticoagulation regimen be altered? J Oral Maxillofac Surg. 2000;58(2):131-5.
7. Chinnaswami R, Bagadia RK, Mohan A, Kandaswamy E, Chandrasekaran D. Dentists' knowledge, attitude and practice in treating patients taking oral antithrombotic medications-A survey. J Clin Diagnostic Res. 2017;11(1):ZC88-ZC91.
8. Doumani M, Habib A, Karyri M, Adi A, Shahada BM, Kiki AH et al. Internship Dentists' Knowledge and Attitude toward Dental Management of Patients on Anti-Platelets Drugs. J Dent Med Sci. 2017;16(12):72-5.
9. Grines CL, Bonow RO, Casey DE, Gardner TJ, Lockhart PB, Moliterno DJ et al. Prevention of Premature Discontinuation of Dual Antiplatelet Therapy in Patients with Coronary Artery Stents. J Am Coll Cardiol. 2007;49(6):734-9.
10. Guyatt GH, Akl EA, Crowther M, Gutterman DD, Schuünemann HJ, American College of Chest Physicians Antithrombotic Therapy and Prevention of Thrombosis Panel. Executive summary: Antithrombotic Therapy and Prevention of Thrombosis, 9th ed: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines. Chest. 2012;141(2):7S-47.
11. Henderson JM, Bergman S, Salama A, Koterwas G. Management of the oral and maxillofacial surgery patient with thrombocytopenia. J Oral Maxillofac Surg. 2001;59(4):421-7.
12. Jiménez Y, Poveda R, Gavaldá C, Margaix M, Sarrión G, Yolanda Jiménez D. An update on the management of anticoagulated patients programmed for dental extractions and surgery. Med Oral Patol Oral Cir Bucal. 2008;13(3):176.
13. Lillis T, Ziakas A, Koskinas K, Tsirlis A, Giannoglou G. Safety of dental extractions during uninterrupted single or dual antiplatelet treatment. Am J Cardiol. 2011;108(7):964-7.
14. Linnebur SA, Ellis SL, Astroth JD. Educational Practices Regarding Anticoagulation and Dental Procedures in U.S. Dental Schools. J Dent Educ. 2007;71(2):296-303.
15. Madrid C, Sanz M. What influence do anticoagulants have on oral implant therapy? A systematic review. Clin Oral Implants Res. 2009;20(4):96-106.
16. Majeed A, Hwang H-G, Connolly SJ, Eikelboom JW, Ezekowitz MD, Wallentin L et al. Management and Outcomes of Major Bleeding During Treatment With Dabigatran or Warfarin. Circulation. 2013;128(21):2325-32.
17. Ringel R, Maas R. Dental procedures in patients treated with antiplatelet or oral anticoagulation therapy-an anonymous survey. Gerodontology. 2016;33(4):447-52.
18. Robless P, Mikhailidis DP, Stansby G. Systematic review of antiplatelet therapy for the prevention of myocardial infarction, stroke or vascular death in patients with peripheral vascular disease. Br J Surg. 2002;88(6):787-800.
19. Rodriguez-Cabrera M, Barona-Dorado C, Leco-Berrocal I, Gomez-Moreno G, Martinez-Gonzalez J. Extractions without eliminating anticoagulant treatment: A literature review. Med Oral Patol Oral y Cir Bucal. 2011;16(6):e800-4.
20. Sacco R, Sacco M, Carpenedo M, Mannucci PM. Oral surgery in patients on oral anticoagulant therapy: a randomized comparison of different intensity targets. Oral Surg Oral Med Oral Pathol Oral Radiol Endodontol. 2007;104(1):e18-21.
21. Santhosh Kumar MP. Knowledge, attitude and practices of dental students toward dental management of patients on antiplatelet therapy. Asian J Pharm Clin Res. 2016;9:3.
22. Shah AH, Khalil HS, Alshahrani FA, Khan SQ, AlQthani NR, Bukhari IA et al. Knowledge of medical and dental practitioners towards dental

management of patients on anticoagulant and/or anti-platelet therapy. Saudi J Dent Res. 2015;6(2):91-7.
23. Snipelisky D, Kusumoto. Current strategies to minimize the bleeding risk of warfarin. J Blood Med. 2013;4:89.
24. Stafford RS, Monti V, Ma J. Underutilization of Aspirin Persists in US Ambulatory Care for the Secondary and Primary Prevention of Cardiovascular Disease. PLoS Med. 2005;2(12):e353.
25. Wahl MJ. Myths of Dental Surgery in Patients. J Am Dent Assoc. 2000;131(1):77-81.

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