jcda.ca

Outpatient Medication Use and Implications for Dental Care: Guidance for Contemporary Dental Practice

Jacob Fitzgerald,; **Joel B. Epstein,** DMD, MSD, FRCD(C), FDS, RCSE; **Mark Donaldson,** BSP, PHARMD, FASHP, FACHE; **Gordon Schwartz,** DDS, Dip Perio, PhD; **Cameron Jones,** DDS, Dip Perio; **Karen Fung,** DMD, MPH, Dip Perio, FRCD(C)

Posted on July 07, 2015

Tags: adverse reactions pharmacology treatment

Cite this as: ***J Can Dent Assoc* 2015;81:f10**

ABSTRACT

Background: Adverse effects of medication used in dental care are likely to increase as North Americans live longer, experience more and greater severity of chronic conditions and take more medications. Thus, documentation of medication use and the implications for contemporary dental practice is of increasing importance.

Methods: We recorded medication use in patients referred to a large private periodontal practice in Ottawa, Ontario. Patients self-reported medication use and medication allergies in their health history forms on admission.

Results: Of 322 sequential patients enrolled, 164 were female and the overall median age was 52 (range 6–94 years). Participants reported taking 249 unique medications in 28 categories. Two-thirds of patients (63.7%) were taking prescription or over-the-counter (OTC) medications or both. The average number of medications per patient was 1.9 (range 0–14). The average number of OTC medications per patient was 0.5 for those not taking prescription medications and 0.4 for patients taking prescription medications concurrently. The number of OTC products per patient was 0–7.

Conclusions: Given the prevalence of the use of both prescription and OTC products, accurate recording of the medication profile is necessary in contemporary dental practice. Medication use and medication allergies provide information on patients' medical history and diagnoses that may have implications for their oral condition and delivery of dental care. Additional concerns include potential interactions between frequently used medications reported by patients and medications that are commonly used in dentistry.

Clinical Implications: The increase in the use of multiple medications and OTC products by the outpatient community has an impact on dental care and prescribed medications in dental care. Thus, it is important to have a complete and accurate medication history to ensure a high standard of care in dental practice.

Adverse drug events including interactions between drugs and diet, dietary supplements and other drugs are likely to increase as North Americans live longer, have more chronic conditions and take more medications.[1] In the United States, 40% of adults 65 years of age or older regularly, take 5–9 medications and 18% take 10 or more.[2] Similarly, recent data from the Canadian Institute for Health Information show that almost two-thirds (62%) of Canadians age 65 and older are using 5 or more classes of prescription drugs.[3] Age-related physiological changes, a greater degree of frailty, a larger number of coexisting and comorbid conditions and polypharmacy have been associated with increased risk of adverse events.[4,5] Older adults are nearly 7 times more likely than younger people to have an adverse drug event that requires admission to hospital.[6]

Given the prevalence of medication use among consumers and the aging population, drug–drug interactions warrant consideration in dental practice. In addition, as nearly 70% of patients do not discuss their use of supplements, vitamins and over-the-counter (OTC) medications with their health care providers, oral health care professionals should ask all patients about their use of these

medications.[7]

We recorded medication use in patients referred to a large private periodontal practice in Ottawa, Ontario. Our goals were to document the medication use in a population of outpatients, to define the medication profile and to discuss the implications of medication use in dental care among the periodontal population. We used clinical databases and decision-support tools to classify interactions according to the level of risk they may pose to the patient. We addressed interactions of greatest clinical concern based on evidence from randomized controlled clinical trials or meta-analyses (quantitative systematic reviews).

Methods

A total of 352 consecutive patients referred for periodontal care between 1 June 2013 and 23 July 2013 were enrolled in the study. Thirty patients were excluded, as they refused to provide written consent. Of the 322 remaining, 164 were female and 158 male, and their median age was 52 years (range 6–94 years). All patients included in the study provided their informed consent to participate in the medication survey and allow the use of de-identified data for research purposes; participation was entirely voluntary. Informed consent to standard practice treatment was also provided. The patients' medication use, self-reported in health history forms on admission, was confirmed through an interview with the patient. De-identified data were entered and analyzed using Microsoft Excel (Microsoft Inc., Redmond, Wash.).

We assessed the clinical implications of the medications used to provide guidance in contemporary dental practice. To determine the risks associated with particular OTC–, dietary supplement– and drug–drug interactions, we selected 2 clinical databases commonly used to evaluate drug–drug interactions (Lexicomp[8]) and dietary supplement–drug interactions (Natural Medicines Comprehensive Database[9]). These tools are helpful in classifying potential interactions according to the level of risk to the patient. Furthermore, they can inform clinical decision-making and treatment plans should potential risk be present.

Results

Participants reported taking 249 unique medications in 28 categories (32 medications were unspecified, i.e., patients could not identify the specific medication, but did know the medication category). The numbers of unique prescription, herbal and OTC medications are presented in **Table 1**.

Table 1 Prescription, herbal and over-the-counter medications, by class, reported by patients referred to a private periodontal practice.

Class of medication	No. respondents (*Total n = 322*)	Percentage of total respondents (*n/322*)	Prevalence of drug class, %*
Antihypertensive medication Selective and non-selective beta-blockers: 13/114 (11.4%) Angiotensin converting enzyme inhibitors: 34/114 (29.8%) Angiotensin II receptor blockers: 14/114 (12.3%) Calcium-channel blockers: 17/114 (14.9%) Diuretics: 36/114 (31.6%)	114	35.4	18.9
Dietary supplements	70	21.7	11.6
Blood thinners Anticoagulants: 7/40 (17.5%) Antiplatelets: 33/40 (82.5%)	40	12.4	6.6
Vitamins	39	12.1	6.5
Psychiatric medications Selective serotonin reuptake inhibitors: 12/32 (37.5%)			

Others: 20/32 (62.5%)	32	9.9	5.3
Hypoglycemic medications Type I diabetes medication (insulin): 10/29 (34.5%) Type II diabetes medication: 19/29 (65.5%)	29	9.0	4.8
Gastric ulcer medication Proton pump inhibitors: 18/25 (72.0%) Histamine blockers: 7/25 (28.0%)	25	7.8	4.2
Hypolipidemic medication HMG CoA reductase inhibitors (statins): 21/24 (87.5%) Others: 3/24 (12.5%)	24	7.5	4.0
Analgesic medication Non-steroidal anti-inflammatory drugs: 12/24 (50.0%) Opioids: 12/24 (50.0%)	24	7.5	4.0
Hypothyroid medication	20	6.2	3.3
Osteoporosis medication	17	5.3	2.8
Chronic obstructive pulmonary disease and asthma medication	16	5.0	2.7
Hormone replacement therapy (estrogen and/or progesterone)	14	4.3	2.3
Ophthalmic medication	13	4.0	2.2
Benign prostatic hypertrophy medication	9	2.8	1.5
Antihistamine medication	8	2.5	1.3
Chemotherapy	7	2.2	1.2
Oral contraceptive medication	7	2.2	1.2
Laxatives and stool softeners	7	2.2	1.2
Immunosuppressant medication	5	1.6	0.8
Oral sedatives	5	1.6	0.8
Antibiotic medication	4	1.2	0.6
Central nervous system stimulants	4	1.2	0.6
Irritable bowel syndrome medication	4	1.2	0.6
Anticonvulsant medication	3	0.9	0.5
Antimigraine medication	3	0.9	0.5
Corticosteroid medication	3	0.9	0.5
Miscellaneous medications	12	3.7	2.0

** Prevalance was calculated as a percentage: the number of respondents receiving a medication from a particular drug class, divided by the total number of medications taken from all drug classes. Many respondents were taking more than one medication, making this denominator 602. For example, in the case of antihypertensive medications, 114 respondents were taking one of these*

medications out of the total 602 medications recorded (18.9% prevalence).
Note: HMG CoA = 3-hydroxy-3-methylglutaryl-coenzyme A.

Two-thirds of patients (205 or 63.7%) were taking prescription or OTC medications or both. The number of all medications taken ranged from 0 to 14. The average number of prescription medications taken per patient in the whole study sample was 1.9.

Among those who reported taking medications (prescription and non-prescription), the average number was 2.6 per patient; for prescription medications alone, the average was 2.2 per patient. Among patients not taking prescription medications, the average number of OTC medications was 0.5 per patient; among those taking prescription medications, the average was 0.4 OTC medications per patient. The range was 0–7 OTC products.

Patients' self-reporting of allergy to medications was also recorded (**Table 2**). Allergies to antibiotics were the most commonly reported allergies (61 patients or 18.9%). Penicillin produced the highest prevalence of allergies (35 patients or 10.9%) with sulfa medications second (17 patients or 5.3%). From a dental perspective, all medication allergies are noteworthy as every drug reported in our study, with the exception of doxorubicin, estrogen, and spironolactone, falls into categories of medications that are commonly used in dental practice (**Table 3**).[10]

Table 2 Allergy to medications reported by patients referred to a private periodontal practice.

Class of medication	No. respondents (%), *n* = 322
Penicillins	35 (10.9)
Sulfa medications	17 (5.3)
Opioids Codeine: 11/13 (84.6%) Demerol: 2/13 (15.4%)	13 (4.0)
Aspirin	7 (2.2)
Non-steroidal anti-inflammatory drugs	5 (1.6)
Local anesthetic (undefined)	4 (1.2)
Latex	3 (0.9)
Tetracycline	3 (0.9)
Clindamycin	3 (0.9)
Barbiturates	1 (0.3)
Cephalosporin	1 (0.3)
Diphenhydramine	1 (0.3)
Doxorubicin	1 (0.3)
Erythromycin	1 (0.3)
Estrogen	1 (0.3)
Nitrofurantoin	1 (0.3)
Spironolactone	1 (0.3)
Tubocurarine	1 (0.3)

Table 3 Medications commonly used in dentistry.[10]

	Analgesics and

Antibiotics and antifungals	Emergency medications	Local anesthetics	anti-inflammatory agents	Sedatives
Amoxicillin	Acetylsalicylic acid	Articaine	Acetaminophen	Benzodiazepines (alprazolam, diazepam, lorazepam, midazolam and triazolam)
Azithromycin	Diphenhydramine	Bupivacaine	Acetylsalicylic acid	Zolpidem
Cephalexin	Epinephrine	Lidocaine (± epinephrine)	Codeine	
Chlorhexidine (topical)	Flumazenil	Mepivacaine (± levonordefrin)	Glucocorticoids (dexamethasone)	
Clarithromycin	Glucose	Prilocaine	Ibuprofen	
Clindamycin	Naloxone	Benzocaine (topical)	Oxycodone	
Clotrimazole (topical)	Nitroglycerine	Lidocaine (topical)		
Doxycycline	Oxygen	Tetracaine (topical)		
Fluconazole	Salbutamol			
Metronidazole				
Nystatin				
Penicillin				
Tetracycline				

Discussion

Medication use by patients can have an impact on care in contemporary dental practice. Knowledge of a patient's medication use provides information on his or her medical history and diagnoses that may have implications for the oral condition and subsequent delivery of dental care. In addition, oral complications of systemic medications, such as xerostomia, have repercussions in oral care because of their impact on risk of oral disease. Further concerns include potential interactions between reported frequently used medications and medications that are commonly used in dentistry (**Table 3**).[10]

The results of this study are particularly relevant in a periodontal practice, but may not be representative of what is seen in a general dental practice. Periodontal practices include more mature patients (median age 52 years) compared with the general Canadian population (median age 40 years).[11] The higher proportion of mature patients positions periodontal practices well to examine medication use in a demographic group that typically takes many medications. This suggests that the number, diversity and type of medications taken by our sample group may not be consistent with the average population of many general dentistry practices. In this study, 63.7% of patients reported taking at least 1 medication, whereas the prevalence is 40.5% in the general Canadian population.[12] A number of conditions are also associated with periodontal diseases (e.g., diabetes) and, thus, a higher prevalence of medication intake.

We found that approximately a third of patients in a periodontal private practice were taking an antihypertensive medication (114 or 35.4%). The common use of medications for blood pressure control has significant implications for dental care on many levels. Ideally, blood pressure should be measured before any dental procedure in patients who are taking antihypertenisve medications. A number of factors can alter control of blood pressure, and treating patients with uncontrolled hypertension may be associated with serious risks. Measuring blood pressure before and after procedures can both minimize the risk (for example, detecting acute hypertensive or hypotensive crises) and provide valuable feedback on the hypertensive therapy for the patient and his or her clinician. During the dental appointment, the patient's blood pressure should be monitored and recorded, and local anesthetics containing a vasoconstrictor should be delivered cautiously following careful aspiration.[13] If hypertension is not controlled, dental treatment should be delayed and medical attention sought.[14]

Evidence also demonstrates a strong association between periodontitis and athlerosclerotic conditions.[15] Although no clear causal relationship has been shown, the 2 conditions are linked and there may be more patients on antihypertensive medications in a peridontal practice.

Antihypertensives are common causes of xerostomia and some drug classes, such as the angiotensin converting enzyme (ACE) inhibitors, are known to cause oral complications including burning mouth and mucosal reactions, such as lichenoid drug eruptions.[16] Nonselective beta-blockers (i.e., propranolol, nadolol) enhance the pressor response to epinephrine, resulting in hypertension and bradycardia. Also, clinicians must exercise caution when prescribing anti-inflammatories for those who take ACE inhibitors and beta-blocking agents. It is well known that non-steroidal anti-inflammatory drugs (NSAIDs) reduce the excretion of antihypertensives resulting in increased serum concentrations, increasing blood pressure by an average of 5 mmHg.[17]Thus, NSAIDs must be used only with caution, and patients' blood pressure should be closely monitored for the duration of treatment. Finally calcium channel blockers, in conjunction with poor oral hygiene, directly cause drug-induced gingival enlargement in about 20% of the population taking these medications.[18]

Dietary supplements were the second most common medications taken by our patients (70 patients or 21.7%) while vitamins were fourth (39 patients or 12.1%). In general, medications that are commonly prescribed by oral health care professionals can be given without regard to interactions with dietary supplements, although patients taking ginkgo biloba, St. John's wort, evening primrose or valerian should consult with their primary provider before taking these supplements with other prescribed medications.[19] As these products are unregulated, their composition, purity, bioavailability, biological activity and drug interactions are poorly understood. Oral health care professionals who are challenged with patients taking these types of supplements may benefit from consulting clinical databases, such as the Natural Medicines Comprehensive Database,[9] to help understand interactions between drugs and these supplements. This tool and others like it are helpful in classifying interactions according to the level of risk they pose to the patient.[20-23] Furthermore, they help with clinical decision-making and treatment plan alterations should potential risk be present.

The use of antithrombotic medications, whether anticoagulants (7 patients or 2.2%) or antiplatelet agents (33 patients or 10.2%), have obvious implications for dental care. In addition to warfarin, 3 new anticoagulants are now available (dabigatran, rivaroxaban and apixaban), and, in addition to aspirin, a number of new antiplatelet agents (clopidogrel, ticlopidine, prasugrel, ticagrelor and vorapaxar) are also now available. The timing of these medications with respect to dental surgery is important as some treatment schedules may have to be modified to reduce the risk of prolonged bleeding following dental surgery.[24-26]Stopping some of these medications before dental treatment poses an inherent risk, as this could put patients at risk of a thromboembolic event. Consultation with the relevant physician is often important when patients are taking antithrombotic medications because of the propensity of these drugs for interactions with other drugs, diet and supplements and the critical nature of coagulation.

Centrally acting and psychiatric medications were used by 32 patients (9.9%) in the population studied. Oral complications resulting from these therapies commonly include xerostomia, with risk of oral and dental complications of hyposalivation and increased or altered muscle function.[27,28] Selective serotonin reuptake inhibitors (SSRIs), such as fluoxetine, paroxetine and others, have been associated with increased bruxism and risk of temporomandibular disorders,[29,30] whereas tricyclic antidepressants (TCAs) have significant anticholinergic effects in some patients, including hypertension, increased intraocular pressure and xerostomia.[31,32] Interactions may also occur between some of these drugs and medications commonly used in dentistry. For example, the synthetic vasoconstrictor levonordefrin has a significantly higher risk of causing hypertension among patients taking TCAs. As such, anesthetics containing this vasoconstrictor (i.e., mepivicaine 3% with 1:20 000 levonordefrin) must be avoided. Also, patients taking SSRIs must avoid taking NSAIDs, as there is an increased risk of gastrointestinal bleeding with long-term use over 4 days.[8,33]

Patients on hypoglycemic medications for type 2 diabetes (19 patients) or insulin for type 1 diabetes (10 patients) comprised 9.0% of the 322 patients surveyed. This prevalence is significantly higher than the 6.8% reported for type 1 and 2 diabetes in Canada.[32] There are many well-established associations among diabetes, periodontal disease and wound healing[34]; thus, oral health care professionals require knowledge of these patients' diabetic history and glycemic control before surgery. People with diabetes are at increased risk of periodontitis, peri-implantitis, xerostomia, secondary fungal infections and taste changes.[35-37] In addition, glycemic control can be compromised following dental treatment if oral pain is experienced and oral intake is compromised. Those with uncontrolled diabetes may be at greater risk of oral complications, healing of surgical wounds may be delayed in poorly controlled diabetes patients and the need for perioperative antibiotic prophylaxis may be considered.[38,39]

Hypolipidemic medications were taken by 24 (7.5%) of our patients, with the 3-hydroxy-3-methylglutaryl-coenzyme A (HMG CoA) reductase inhibitors (statins) the most prevalent prescription (21/24). Although these medications are not typically a cause for concern in dental treatment, they may be associated with a number of drug interactions including with drugs commonly prescribed in dentistry (clarithromycin, fluconazole, itraconazole and ketoconazole).[8]

Analgesic medications were also used by 24 people (7.5%) in the population we studied; half (12) were taking NSAIDs, such as ibuprofen, and the other half opioid analgesics. Patients may be taking NSAIDs chronically for various reasons, and few cause dental concerns. Notably, concerns include the patient's ability to achieve adequate postoperative hemostasis, as these medications inhibit platelet aggregation and prolong bleeding time in some patients.[40] Dentists prescribe many medications for postoperative dental and oral pain. NSAIDs and/or acetaminophen are the drugs of choice in managing postoperative dental pain that is secondary to inflammation. Opioids are not anti-inflammatory agents and should never be considered the drugs of choice for this indication.[41,42] Only after the dose of the NSAID and/or acetaminophen has been optimized should opioid medication be prescribed for the shortest time possible postoperatively (3 days or less).

New information from the United States Food and Drug Administration (FDA) states that NSAIDs can interfere with the antiplatelet effect of low-dose aspirin (81 mg/day), potentially rendering aspirin less effective when used for cardioprotection and stroke protection.[40] In situations where these drugs could be used concomitantly, the FDA recommends that the dose of ibuprofen be taken at least 30 minutes after aspirin ingestion or more than 8 hours before aspirin ingestion to avoid attenuation of aspirin's effect. With occasional use of ibuprofen, the risk of any attenuation of the antiplatelet effect of low-dose aspirin is likely to be minimal, because of a long-lasting effect of aspirin on platelets.[43,44] Patients taking opioid analgesics before dental treatment may have increased dry mouth as a side effect of these drugs, and sedative agents should be used with caution or avoided because of potential synergistic central nervous system depression that can be caused by this combination.[8] The increasing recognition of opioid abuse requires particular caution in dental practice.

Thyroid medications were taken by 20 patients (6.2%) in our study, slightly fewer than the reported rate of use of such medications in Canada (9.8%).[12] Hypothyroid agents, such as levothyroxine, affect the basal metabolic rate and can have an impact on systemic status, including blood pressure, energy and mood.

The 17 patients (5.3%) in the study who were taking bisphosphonates, primarily for osteoporosis, should be considered in the context of the potential impact of these drugs on wound healing. Although this risk is low compared with the high risk of osteonecrosis associated with IV bisphosphonate administration in oncology, it affects surgical management and should alert the clinician to consider bisphosphonate effects.[45-58] Dose, route of delivery and duration of bisphosphonate therapy should be addressed in the history. New agents, osteolytic inhibitors, are now available and doses used in oncology require the same consideration as bisphosphonates.[49]

Respiratory and allergy medications have implications for dental care, in particular if general anesthesia is considered. These medications should be considered red flags to practitioners alerting them to patients who may have a difficult airway or in whom intubation may be a challenge. Furthermore, these medications are often associated with dry mouth, and their use may impact one's oral and dental status secondary to chronic, drug-induced hyposalivation or xerostomia. In our patient population 16 people (5.0%) were taking medications for chronic obstructive pulmonary disease or asthma. Because asthmatic "attacks" can often be brought on by stressful situations or exposure to inhaled aerosols, such as in the dental environment, these patients should be encouraged to have have their own "rescue" medications on hand at all times. Inhaled salbutamol is the most common β_2-adrenergic receptor agonist used to treat acute bronchospasm, which may be experienced during an asthmatic attack or anaphylaxis.[50] For this reason, salbutamol is 1 of the 7 required medications in the minimal dental emergency kit, as not all patients will remember to have their rescue medication on hand.[50]

Although the prevalence of the remaining 16 drug categories in our study was less than 5% each, the implications of their use in dental care warrant consideration. Patients on chemotherapy (in our study, 7 or 2.2%), immunosuppressants (5 or 1.6%) and corticosteroids (3 or 0.9%) may have delayed or poor postoperative healing and may be at increased risk of surgical infections or secondary fungal infections. Perioperative antibiotic prophylaxis may be warranted in these patients.[51]

The use of hormone replacement therapy (14 patients in our study or 4.4%) or oral contraceptives (7 patients or 2.2%) is known to have implications for blood clot formation and wound healing following surgical dental care.[52,53] In addition, for patients taking oral contraceptives, antibiotic interactions may reduce the effectiveness of the contraceptive, and patients should be informed of this risk. From a periodontal standpoint, patients on oral contraceptives have an increased risk of plaque-induced gingival diseases, as they experience a heightened inflammatory response to plaque biofilm.[54]

We also evaluated allergy risk, as dentists prescribe medications with the potential to cause allergic and anaphylactic reactions (**Table 2**). From a dental perspective, all allergies to medications are particularly noteworthy as almost every drug class reported in our study falls into categories of medications that are commonly used in the dental practice.[10]Many of these allergies can have significant implications for planned dental treatment. If noted on a patient record, the nature of the reaction must be investigated as many patients confuse allergic reactions with intolerances; for example, most gastrointestinal symptoms represent side effects of medications rather than true allergic reactions. This is important information as a patient who is considered allergic to a medication, should avoid exposure and clinicians should avoid prescribing such drugs to these patients.

There were a few limitations on this study. The reporting of medications relied in part on full and complete disclosure by the patient. Some patients may not recall all of the medications they are taking and others do not disclose all medications for personal reasons or because the medications are taken irregularly or sporadically. Given the demographic of our study population, the paucity of medications for erectile dysfunction might be evidence of that.

Another limitation is the lack of specific investigation into the prevalence of illicit drug use. Self-reporting of such drug use is likely unreliable, and these drugs are prone to interactions with many OTC and prescription drugs and dietary supplements.[55-60] Even in a research setting, few patients are willing to self-report use of illicit medications despite the importance of this information to their safe care.[61-63] There has been a significant increase in research around screening and brief intervention (SBI) as it applies to patients who are at risk of health problems resulting from substance abuse. As a public health initiative, the aim of SBI is to improve community health by reducing the prevalence of adverse consequences of substance use through the organization and

coordination of early intervention services.[64] Evidence for the effectiveness of SBI in medical settings has been summarized in several reviews and meta-analyses.[64-67] The success of SBI in medical settings suggests that oral health providers are an untapped resource for giving advice and brief counseling to illicit drug and tobacco users.[68]

Conclusions

Given the prevalence of the use of both prescription and OTC drugs, accurate recording of a patient's medication profile is necessary to guide contemporary dental practice and mitigate potential risk. Medication use and medication allergies provide information about a patient's medical history and diagnoses that may affect the oral condition and delivery of dental care. Additional concerns include potential interactions between frequently used medications reported by patients and medications that are commonly used in dentistry, with the result that medication use by patients can impact care in contemporary dental practice. Close consideration of these issues is required to provide the best care and optimal patient safety.

THE AUTHORS

Mr. Fitzgerald *is a dental student at the University of Toronto, Toronto, Ontario.*

Dr. Epstein *is a consultant in the division of otolaryngology and head and neck surgery at the City of Hope National Medical Center, Duarte, California, Samuel Oschin Comprehensive Cancer Institute, Cedars Sinai Medical Center in Los Angeles, California, and maintains a private practice in Vancouver, British Columbia.*

Dr. Donaldson *is director, performance services, VHA Clinical Pharmacy, clinical professor, School of Pharmacy, University of Montana, and clinical assistant professor, School of Dentistry, Oregon Health & Sciences University.*

Dr. Schwartz *is in private practice in Ottawa, Ontario.*

Dr. Jones *is in private practice in Ottawa, Ontario.*

Dr. Fung *is in private practice in Ottawa, Ontario, and associate clinician, division of dentistry/oral and maxillofacial surgery, Ottawa Hospital.*

Acknowledgment: *We would like to thank Roxanne McFarlane for her role in data collection for this manuscript.*

Correspondence to: *Dr. Karen Fung, 404–240 Catherine St, Ottawa ON K2P 2G8. Email: Kfung@gumdocs.com*

The authors have no declared financial interests in any company manufacturing the types of products mentioned in this article.

This article has been peer reviewed.

References

1. Budnitz DS, Lovegrove MC, Shehab N, Richards CL. Emergency hospitalizations for adverse drug events in older Americans. N Engl J Med. 2011;365(21):2002-12.
2. Patterns of medication use in the United States, 2006: a report from the Slone Survey. Boston: Slone Epidemiology Center at Boston University [accessed 2014 Mar 27]. Available http://www.bu.edu/slone/files/2012/11/SloneSurveyReport2006.
3.
4. Drug use among seniors on public drug programs in Canada, 2002 to 2008: a report from the Canadian Institute for Health Information. Ottawa: CIHI; 2010 [accessed 2014 Mar 27]. Available https://secure.cihi.ca/free_products/drug_use_in_seniors_2002-2008_e.pdf
5. ElDesoky ES. Pharmacokinetic-pharmacodynamic crisis in the elderly. Am J Ther. 2007;14(5):488-98.
6. McLean AJ, Le Couteur DG. Aging, biology, and geriatric clinical pharmacology. Pharmacol Rev. 2004;56(2):163-84.
7. Budnitz DS, Pollock DA, Weidenbach KN, Mendelsohn AB, Schroeder TJ, Annest JL. National surveillance of emergency department visits for outpatient adverse drug events. JAMA. 2006;296(15):1858-66.
8. Gardiner P, Graham RE, Legedza AT, Eisenberg DM, Phillips RS. Factors associated with dietary supplement use among prescription medication users. Arch Intern Med. 2006;166(18):1968-74.
9. Lexicomp Online Clinical Database 2012. Alphen aan den Rijn, Netherlands: Wolters Kluwer; 2012 [accessed 2014 Mar 27]. Available: http://www.lexi.com/institutions/online.jsp?id=databases.
10. Jellin JM, ed. Natural medicines comprehensive database. Stockton, Calif.: Therapeutic Research Faculty; 2015 [accessed 2014 Mar 27]. Available: www.naturaldatabase.com.
11. Donaldson M, Goodchild JH. Pregnancy, breast-feeding and drugs used in dentistry. J Am Dent Assoc. 2012;143(8):858-71.
12. Canada's population estimates: age and sex, 2013. Ottawa: Statistics Canada; 2013 [accessed 2014 Sept 5]. Available: www.statcan.gc.ca/daily-quotidien/131125/dq131125a-eng.pdf.
13. Rotermann M, Sanmartin C, Hennessy D, Arthur M. Prescription medication use by Canadians aged 6 to 79. Health Rep. 2014;25(6):3-9.
14. Becker DE, Reed KL. Local anesthetics: review of pharmacological considerations. Anesth Prog. 2012;59(2):90-101.
15. Herman WW, Konzelman JL Jr, Prisant LM; Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. New national guidelines on hypertension: a summary for dentistry. J Am Dent Assoc. 2004;135;(5):574-84.
16. Tonetti MS, Van Dyke TE; working group 1 of the joint EFP/AAP workshop. Periodontitis and atherosclerotic cardiovascular disease: consensus report of the Joint EFP/AAP Workshop on Periodontitis and Systemic Diseases. J Periodontol. 2013;84(4 Suppl):S24-9
17. Habbab KM, Moles DR, Porter SR. Potential oral manifestations of cardiovascular drugs. Oral Dis. 2010;16(8):769-73.
18. Risser A, Donovan D, Heintzman J, Page T. NSAID prescribing precautions. Am Fam Physician. 2009;80(12):1371-8.
19. Sanz M. Current use of calcium channel blockers (CCBs) is associated with an increased risk of gingival hyperplasia. J Evid Based Dent Pract. 2012;12(3 Suppl):147-8.
20. Donaldson M, Touger-Decker R. Dietary supplement interactions with medications used commonly in dentistry. J Am Dent Assoc. 2013;144(7):787-94.
21. American Herbalists Guild : an association of herbal practitioners. Asheville, N.C.: American Herbalists Guild [accessed 2014 Mar 29]. Available: www.americanherbalistsguild.com.

22. Herb Research Foundation. Boulder, Col.: Herb Research Foundation [accessed 2014 Mar 29]. Available: www.herbs.org.

23. National Center for Complementary and Alternative Medicine. Bethesda, Md.: National Institutes of Health [accessed 2014 Mar 29]. Available: www.nccam.nih.gov.

24. Office of Dietary Supplements. Bethesda, Md.: National Institutes of Health [accessed 2014 Mar 29]. Available: www.ods.od.nih.gov.

25. Kudsi Z, Dalati MH, Sibai L, Koussayer LT. Management of bleeding disorders in the dental practice: managing patients on anticoagulants. Dent Update. 2012;39(5):358-60, 363.

26. Goodchild JH, Donaldson M. An evidence-based dentistry challenge: treating patients on warfarin (Coumadin). Dent Implantol Update. 2009;20(1):1-8.

27. Henry RG. Dental management of patients taking antiplatelet medications. Tex Dent J. 2009;126(7):608-16.

28. Uher R, Farmer A, Henigsberg N, Rietschel M, Mors O, Maier W, et al. Adverse reactions to antidepressants. Br J Psychiatry. 2009;195(3):202-10.

29. Spanemberg JC, Cherubini K, de Figueiredo MA, Yurgel LS, Salum FG. Aetiology and therapeutics of burning mouth syndrome: an update. Gerodontology. 2012;29(2):84-9.

30. Ak M, Gulsun M, Uzun O, Gumus HO. Bruxism associated with serotonin reuptake inhibitors: two cases. J Clin Psychopharmacol. 2009;29(6):620-2.

31. Sabuncuoglu O, Ekinci O, Berkem M. Fluoxetine-induced sleep bruxism in an adolescent treated with buspirone: a case report. Spec Care Dentist. 2009;29(5):215-7.

32. Taylor D. Antidepressant drugs and cardiovascular pathology: a clinical overview of effectiveness and safety. Acta Psychiatr Scand. 2008;118(6):434-42.

33. Rocha FL, Fuzikawa C, Riera R, Hara C. Combination of antidepressants in the treatment of major depressive disorder: a systematic review and meta-analysis. J Clin Psychopharmacol. 2012;32(2):278-81.

34. Becker DE. Psychotropic drugs: implications for dental practice. Anesth Prog. 2008;55(3):89-99.

35. Chapple IL, Genco R; working group 2 of the joint EFP/AAP workshop. Diabetes and periodontal diseases: consensus report of the Joint EFP/AAP Workshop on Periodontitis and Systemic Diseases. J Periodontol. 2013;84(4 Suppl):S106-12.

36. Ali D, Kunzel C. Diabetes mellitus: update and relevance for dentistry. Dent Today. 2011;30(12):45-6, 48-50.

37. Lalla E, Lamster IB. Assessment and management of patients with diabetes mellitus in the dental office. Dent Clin North Am. 2012;56(4):819-29.

38. Wilson MH, Fitzpatrick JJ, McArdle NS, Stassen LF. Diabetes mellitus and its relevance to the practice of dentistry. J Ir Dent Assoc. 2010;56(3):128-33.

39. Alexander RE. Routine prophylactic antibiotic use in diabetic dental patients. J Calif Dent Assoc. 1999;27(8):611-8.

40. Barasch A, Safford MM, Litaker MS, Gilbert GH. Risk factors for oral postoperative infection in patients with diabetes. Spec Care Dentist. 2008;28(4):159-66.

41. Ferraris VA, Saha SP, Oestreich JH, Song HK, Rosengart T, Reece TB, et al. 2012 Update to the Society of Thoracic Surgeons guideline on use of antiplatelet drugs in patients having cardiac and noncardiac operations. Ann Thorac Surg. 2012;94(5):1761-81.

42. Donaldson M, Goodchild JH. Appropriate analgesic prescribing for the general dentist. Gen Dent. 2010;58(4):291-7.

43. Becker DE. Pain management: Part 1: Managing acute and postoperative dental pain. Anesth Prog. 2010;57(2):67-78.

44. Schuijt MP, Huntjens-Fleuren HW, de Metz M, Vollaard EJ. The interaction of ibuprofen and diclofenac with aspirin in healthy volunteers. Br J Pharmacol. 2009;157(6):931-4.

45. Steinhubl SR. The use of anti-inflammatory analgesics in the patient with cardiovascular disease: what a pain. J Am Coll Cardiol. 2005;45(8):1302-3.

46. Vescovi P, Merigo E, Meleti M, Manfredi M, Guidotti R, Nammour S. Bisphosphonates-related osteonecrosis of the jaws: a concise review of the literature and a report of a single-centre experience with 151 patients. J Oral Pathol Med. 2012;41(3):214-21.

47. Allen MR. The effects of bisphosphonates on jaw bone remodeling, tissue properties, and extraction healing. Odontology. 2011;99(1):8-17.

48. Landesberg R, Cozin M, Cremers S, Woo V, Kousteni S, Sinha S, et al. Inhibition of oral mucosal cell wound healing by bisphosphonates. J Oral Maxillofac Surg. 2008;66(5):839-47.

49. Wang HL, Weber D, McCauley LK. Effect of long-term oral bisphosphonates on implant wound healing: literature review and a case report. J Periodontol. 2007;78(3):584-94.

50. Epstein MS, Epstein JB, Ephros HD. The effects of osteoclast modifiers on the oral cavity: a review for prescribers. Curr Opin Support Palliat Care. 2012;6(3):337-41.

51. Rosenberg M. Preparing for medical emergencies: the essential drugs and equipment for the dental office. J Am Dent Assoc. 2010;141 Suppl 1:14-9S.

52. Ramu C and Padmanabhan TV. Indications of antibiotic prophylaxis in dental practice — review. Asian Pac J Trop Biomed. 2012;2(9):749-54.

53. American College of Obstetricians and Gynecologists Committee on Gynecologic Practice. ACOG Committee opinion no. 420. November 2008: hormone therapy and heart disease. Obstet Gynecol. 2008;112(5):1189-92.

54. Reid R; Society of Obstetricians and Gynaecologists of Canada. SOGC clinical practice guideline. No. 252, December 2010. Oral contraceptives and the risk of venous thromboembolism: an update. J Obstet Gynecol Can. 2010;32(12):1192-204.

55. Caton JG, Greenwell H, Mahanonda R, Williams R, Zappa U, Claffey N. Consensus report: dental plaque-induced gingival diseases. *Ann Periodontol.* 1999;4(1):18-9.

56. Swendsen J, Burstein M, Case B, Conway KP, Dierker L, He J, et al. Use and abuse of alcohol and illicit drugs in US adolescents: results of the National Comorbidity Survey —Adolescent Supplement. Arch Gen Psychiatry. 2012;69(4):390-8.

57. Degenhardt L, Hall W. Extent of illicit drug use and dependence, and their contribution to the global burden of disease. Lancet. 2012;379(9810):55-70.

58. Goodchild JH, Donaldson M. Methamphetamine abuse and dentistry: a review of the literature and presentation of a clinical case. Quintessence Int. 2007;38(7):583-90.

59. Ilgen M, Edwards P, Kleinberg F, Bohnert AS, Barry K, Blow FC. The prevalence of substance use among patients at a dental school clinic in Michigan. J Am Dent Assoc. 2012;143(8):890-6.

60. Donaldson M, Goodchild JH. Oral health of the methamphetamine abuser. Am J Health Syst Pharm. 2006;63(21):2078-82.

61. Shetty V, Mooney LJ, Zigler CM, Belin TR, Murphy D, Rawson R. The relationship between methamphetamine use and increased dental disease. J Am Dent Assoc. 2010;141(3):307-18.

62. Pallasch TJ, McCarthy FM, Jastak JT. Cocaine and sudden cardiac death. J Oral Maxillofac Surg. 1989;47(11):1188-91.

63. Lee CY, Heffez LB, Mohammadi H. Crystal methamphetamine abuse: a concern to oral and maxillofacial surgeons. J Oral Maxillofac Surg. 1992;50(10):1052-4.

64. Yagiela JA. Adverse drug interactions in dental practice: interactions associated with vasoconstrictors. Part V of a series. J Am Dent Assoc. 1999;130(5):701-9.

65. Babor T, McRee BG, Kassebaum PA, Grimaldi PL, Ahmed K, Bray J. Screening, brief intervention, and referral to treatment (SBIRT): toward a public health approach to the management of substance abuse. Subst Abus. 2007;28(3):7-30.

66. Havard A, Shakeshaft A, Sanson-Fisher R. Systematic review and meta-analyses of strategies targeting alcohol problems in emergency departments: interventions reduce alcohol-related injuries. Addiction. 2008;103(3):368-76.

67. Nilsen P, Baird J, Mello MJ, Nirenberg T, Woolard R, Bendtsen P, et al. A systematic review of emergency care brief alcohol interventions for injury patients. J Subst Abuse Treat. 2008;35(2):184-201.

68. Fiore MC, Jaen CR, Baker TB, Bailey WC, Benowitz NL, Curry SJ, et al. Treating tobacco use and dependence : 2008 update. Rockville, Md.: US Department of Health and Human Services, Public Health Service; 2008.

69. McRee B. Open wide! Dental settings are an untapped resource for substance misuse screening and brief intervention. Addiction. 2012;107(7):1197-8

Comments:

Name: *

Email: *

Comments: *

Please type the characters you see in the picture below.

Submit

*All fields marked with an asterisk * are mandatory.*

Comments submitted in response to articles may be published in *CDA Essentials magazine*.

JCDA.ca reserves the right to review, edit, refuse or delete any comment.

ISSN: 1488-2159