

Protocols in *Dental Conditions*



Recurrent Aphthous Ulcers

Dental Abscess

Xerostomia



This handbook was compiled by Daniela Attard as part of an undergraduate project carried out for the partial fulfillment of the requirements of the course leading to the Degree of Bachelor of Pharmacy (Honours).

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How to use the handbook

This handbook contains explanatory texts for a set of three treatment flowcharts for dental conditions, which are designed to guide the pharmacist through important steps to follow when responding to the patient and providing appropriate advice. These protocols should be considered as clinical guidelines and are not intended to replace the pharmacist's clinical judgement.

It is intended to be used with the booklet since it provides justification and additional information to supplement the steps and decisions taken in the flowchart. For ease of reference, the numbered sections in the text are intended to correspond to the complimentary step in the flowchart. Hence, step 1 of the "Introductory protocol" corresponds to the paragraph headed "step 1" in the explanatory text. Possible treatments along with the method and frequency of administration were detailed. Also, emphasis was given to lifestyle modifications that may improve or prevent the occurrence of the condition.

Introduction

Step 1: Pharmacists are health care professionals who share a common aim; of making sure that the patient is receiving adequate treatment, specific to their needs. Community pharmacists have developed measures for information gathering when a patient presents in the pharmacy with a symptom, or when responding to requests for advice and help, one such example of these measures is questioning (Azzopardi, 2000).

Step 2: If the patient presents with a prescription, the pharmacist should go directly to step 9 to proceed to the part of the protocols dedicated to those that have already been offered treatment for this condition. Step 3 should be followed for those patients presenting without a prescription.

Step 3: If it is the patient's first time at the pharmacy, the pharmacist should proceed to step 4. If it is not the first time and the pharmacist thinks that enough information is known about the patient, step 4 can be omitted and go directly to step 5.

Step 4: This is an important step that establishes the identity of the patient, which may include name, age, status, any medical conditions and current treatments.

Step 5: This step is essential since enquiring about the symptoms is a key factor in the role of a community pharmacist. It is important to enquire about the onset, duration, type and intensity of pain. Several mnemonics are available and they may be useful to some pharmacists. Some structured approaches are the SITDOWNSIR, which was developed by Edwards and Stillman, and the WWHAM by Blenkinsopp and Paxton. The first mnemonic allows the pharmacists to investigate deeper into the symptoms present, such as the duration, intensity and severity, location and the onset. On the other hand, the WWHAM mnemonic establishes who the patient is, what the symptoms are, the duration, and any actions or medications taken.

Steps 6-8: These represent the three conditions chosen for this project. For each condition, there is a different protocol as indicated in the connector steps. For Recurrent Aphthous Ulcers protocol (Protocol 1), the pharmacist should refer to step 21. For patients presenting with Xerostomia (Protocol 2) or Dental Abscess (Protocol 3), the protocol starting from step 64 or step 104 should be followed respectively.

Step 9: Establishing the identity of the patient presenting with a prescription is still a vital step. Communication enhances the pharmacist-patient relationship which has trust at its basis¹.

Step 10: This step assesses the “pharmacist’s commitment toward confirming with the patient the indications for which the medication is used” (Azzopardi, 2000). In this day and age, patients are becoming more interested in learning about the medications they are taking. Drug information is easily accessed through websites on the Internet but incorrect information may be obtained. Thus the pharmacist is in an ideal position to provide the patient with any kind of information on the prescribed medication.

Steps 11-12: If the medication is not in stock, the pharmacist can order the medication and ask the patient to collect it later, or refer the patient to another pharmacy. These two possibilities depend on the severity of the condition.

Step 13: Medication may be unsuitable for patients when they are suffering from a condition that is listed as a contra-indication, as is the case of NSAIDs that are contra-indicated in asthmatic patients. The prescribed dose may require adjustments when patients present with other co-morbidities or concomitant medications. This may be essential to avoid accumulation of the drug and therefore toxicity.

Steps 14 & 17: In cases where prescriptions raise any doubts to the pharmacists, the prescriber should be contacted to avoid any errors, including medication errors. Several studies proved that effective doctor-pharmacist collaboration both in clinical and

¹ American Pharmacists Association. Code of Ethics for pharmacists [serial online] 2004; [cited 2010 February 3]. Available from: URL: <http://www.pharmacist.com/AM/Template.cfm?Section=Search1&template=/CM/HTMLDisplay.cfm&ContentID=2903>.

community settings, improves patient care, especially in chronic illnesses (Gallagher and Gallagher, 2010).

Steps 15-16: Checking the medication profile of the patient is a must since prescribed medication can interact with other drugs the patient is taking. This is especially true for elderly patients who present with co-morbidities and thus polypharmacy.

Step 18: The final step before dispensing is that of offering advice on the prescribed medication including method and route of administration, dose, frequency and storage conditions, if applicable. It is of utmost importance that pharmacists advise patients about the actions, adverse drug reactions, and emphasise the importance of adherence to the treatment regimen for maximum benefit (Winfield et al, 2009). This step emphasises the traditional role of the pharmacist.

Step 19: Expiry date of the product should always be checked because it is “illegal to dispense an expired medication, or an imperfect, deteriorated or harmful substance”. Expired medicines should be segregated in a designated quarantine area away from the other medications in the pharmacy².

Step 20: The last step in the protocol for those patients presenting with a prescription is dispensing the medication. Once the medication is dispensed, the pharmacist assumes full responsibility for the patient. If a patient experiences any adverse drug reactions, the pharmacist should report these effects and actively participate in post-marketing surveillance.

²Medicines Act 2003; Part III Article 84. Malta [statute on the Internet]. 2003 [cited 2010 December 3]. Available from: URL: <http://www.medicinesauthority.gov.mt/legislation.htm>.

Recurrent Aphthous Ulcers

Step 21: This data box indicates that the patient presents with Recurrent Aphthous Ulcers (RAU). This condition typically starts in childhood or adolescence, with females being at a higher risk. A genetic disposition is linked to ulcer formation but many other factors can be the cause. There are three main types of RAU, these being minor aphthous ulcers (MiAU - approximately 80% of RAU), Major Aphthous Ulcers (MjAU) and Herpetiform Ulcers (HU). Different clinical characteristics help to distinguish between the three types. Both pharmacological and non-pharmacological measures play a role in the management of ulcers (Scully, 2008).

Steps 22-23, 25: If any of the listed conditions are present, the pharmacist should refer the patient to a dentist or a general practitioner, because these may indicate a more serious underlying pathology. Signs of systemic illness, no associated pain or discomfort and uneven colouration may all indicate an oral carcinoma (Azzopardi, 2010).

Steps 24-25: When the patient presents with extra-oral symptoms i.e. genital or ocular, the patient should be referred. Genital ulceration may indicate Behçet's syndrome, a rare disease of unknown aetiology, which is characterized by uveitis and retinal vasculitis. It mainly affects young males (McLeod and Crighton, 2006). Ocular ulceration may indicate Reiter's syndrome, which is an infection with *Shigella flexneri*, *Salmonella*, *Yersinia* or *Chlamydia* resulting in an arthritic disorder along with conjunctivitis and urethritis, generally affecting adult males. Oral ulceration in this syndrome is painless and superficial (Mosby, 2002).

Steps 26-27: Patients who present with predisposing factors should be referred for correction of possible underlying conditions, or to establish the cause, or both. Iron deficiency may be due to chronic haemorrhage and requires iron replacement therapy as ferrous sulphate 200mg, three times daily for three months. Deficiency of folate may be dietary, due to malabsorption or drugs e.g. cytotoxics, and the dose of folic acid administered depends on the underlying cause (McLeod and Crighton, 2006). Genetic

predisposition is common, affecting about one-third of patients. An example of hormonal disturbances is low progesterone levels in the luteal phase (Scully, 2008).

Step 28: Establishing the number of ulcers is very important, the patient can present with either a single ulcer or multiple ulcers. If only one is present, step 29 should be followed, while if multiple ulcers are present, step 34 should be followed.

Steps 29-33: If the patient only has a single ulcer, the pharmacist should establish whether any chemical has been applied at the site since it may indicate the occurrence of a chemical burn. If the patient is taking any medication, it may indicate that the occurrence of the ulcer is due to a reaction to drugs. If there is obvious trauma, it may possibly indicate that it is a traumatic ulcer, thus elimination of the cause is essential.

Steps 34-36: Once the pharmacist has confirmed that multiple ulcers are present, it is now time for the pharmacist to establish whether the ulcers recur and present individually. In this case, the patient should be referred since it may indicate that it is MjAU or HU, both of which require more complex treatments, including prescription medicines.

Steps 37-39: If the ulcers are recurrent and confluent, the pharmacist must check for any concomitant drugs which may cause the formation of such ulcers, thus referral is recommended since it may possibly indicate a reaction to drugs. If the patient is not taking any medication, it is important to refer the patient to investigate the cause, such as inflammatory bowel diseases.

Steps 40-42: The location of the ulcers should also be established. If the ulcers are located towards the back of the mouth, the patient should be referred since it is likely that they are either MjAU or HU. If they are not located towards the back of the mouth, step 43 should be followed.

Steps 43-45: Establishing the duration of the ulcers is another characteristic of the different presentations of aphthous ulcers. If the ulcers have been present for long duration, such as weeks, referral is essential since MjAU are suspected. The latter heal slowly over 10-40 days (Scully, 2008).

Steps 46-48: The next steps assess the size of the ulcer. Very small ulcers - less than 2mm - should be referred since it is characteristic of HU. Often, they are extremely painful, recur frequently but are uncommon (Scully, 2008). Care should be taken to ensure it is not a MjAU still in its infancy.

Steps 49-52: The age of the patient also has an impact on the management. If the patient is under 10 years (step 50) and it is the first time (step 51), it is important to be referred to establish the cause of the ulcers (step 52).

Steps 53-56: These steps establish whether any medication was previously used to treat the condition, and if yes whether the medication is suitable. The same medication can be dispensed if it is suitable but otherwise step 57 should be followed for a choice of treatment.

Steps 57-58: Here it should be established whether the patient finds the ulcer to be interfering with normal daily activities, such as eating, in which case medication should be dispensed. If not, reassure the patient and offer advice. Treatment is indicated for patients with painful ulcers and ulcers affecting their daily living.

Step 59: This box offers advice on how to manage aphthous ulcers. The patient should be advised first and foremost to avoid foods that may irritate the mouth, for example, hot spices. Also addictive substances such as alcohol, tobacco, caffeine and sweets should be avoided since these may precipitate or aggravate existing condition. Controlling stress, anxiety and exhaustion, and avoiding repetitive actions such as biting lips, tongue or cheeks may help (Mann, 2009). Further advice is to eat healthy foods including vegetables and fruits to prevent any nutritional deficiencies that may lead to the formation of these ulcers. Practicing good oral hygiene habits are also essential, and this includes regular brushing of teeth (2-3 times daily), use of mouthwashes and flossing. Regular visits to the dentist every 6 months should not be missed to ensure that the mouth and teeth are well maintained, and to identify any oral problems or diseases, while the prognosis is still relatively good.

Step 60: This treatment box contains possible over-the-counter medications available locally for the management of recurrent aphthous ulcers. This box ranges from drugs such as topical steroids to simple mouthwashes containing chlorhexidine.

- A thin layer of triamcinolone paste should be applied 4 times daily for not more than 5 days.
- High-molecular-weight hyaluronic acid is available as a mouthwash, gel or junior gel. These formulations are to be used 2-3 times daily, or more if required, after meals for a period of 1 week. 10ml of the mouthwash are to be used every time. The manufacturer advises that ideally no food or drinks should be taken for at least 30 minutes after application. This formulation is indicated to reduce pain and promotes the healing of mouth ulcers. It also reduces the number of ulcers by controlling the inflammatory process and rehydrating the damaged tissues. Pregnant women, diabetics, the elderly or smokers are not contra-indications.
- Benzydamine is available as a mouthwash and a buccal spray. 15ml of the mouthwash should be held in mouth for 1-2 minutes, to be used 3 times daily. On the other hand, 4-8 sprays of the buccal spray should be sprayed every 1.5-3 hours. Benzydamine is an NSAID and therefore is indicated for symptomatic pain and inflammation. It has local disinfectant and anaesthetic properties.
- Chlorhexidine mouthwash should be used three times daily also. Locally, one can find different proprietary products with different concentrations of chlorhexidine.
- Half an inch of choline salicylate gel should be applied, not more often than every 3 hours. It is a topical NSAID and thus it has the same contra-indications as other salicylates, making it contra-indicated for children under 16 years in light of Reye's syndrome. This syndrome is very rare but serious, and it mostly affects children and teenagers. It is characterized by swelling of the liver and brain, and may cause sudden death (Mayo Clinic, 2009).

Steps 61-63: These steps ask whether the treatment was successful and therefore if the patient is receiving adequate treatment. The patient should be referred if he/she returns to the pharmacy demanding another product because there was no improvement in the symptoms.

Xerostomia

Step 64: This data box represents patients presenting to the pharmacy with xerostomia, more commonly known as dry mouth. It may occur due to either reduced salivary flow or due to changes in the composition of saliva. The elderly population is mainly at risk of developing this condition due to polypharmacy and the presence of co-morbidities (Scully, 2008). The symptoms may vary from asymptomatic patients who find difficulties in eating dry food (Cawson and Odell, 2002), to others who may complain of dry mouth along with other features. The presence of this condition has a number of different causes associated with it. Both non-pharmacological and pharmacological measures are available for the management of dry mouth (Scully, 2008).

Steps 65-67: If a patient presents with the accompanying conditions as in step 66, they should be referred to a dentist. Halitosis (oral malodour), extensive tooth decay, candidiasis are possible complications of xerostomia. Dry eyes, joint pain and dry skin may indicate Sjögren's syndrome, which is an autoimmune, chronic inflammatory disease affecting the lacrimal and salivary glands. Patients with uncontrolled diabetes mellitus may develop dry mouth owing to dehydration. The possibility of diabetes needs to be considered in patients who complain of polyuria and polydipsia (McLeod and Crighton, 2006). HIV along with other infections may affect the salivary glands leading to dry mouth (Cawson and Odell, 2002).

Step 68: The pharmacist should enquire about the signs and symptoms of xerostomia. These include difficulty in swallowing dry foods, sipping liquids to aid swallowing, the speech has a clicking quality and the amount of saliva is too sparse most of the time. The symptoms usually worsen at night.

Steps 69-70: One of the functions of saliva is to protect against microorganisms, thus a patient with dry mouth is more prone to oral infections. Moreover, in patients wearing dentures, candida infections are very common, and these should be treated adequately with antifungals for at least two weeks (Huffines, 2007). In case of infection, topical

antifungals such as miconazole gel may be useful to spread on dentures before wearing them. To minimise the risk of oral infections, dentate patients should be advised to wet dentures before wearing them, to leave dentures out of mouth at night and stored in water and to make use of chlorhexidine mouthwash. The latter contains both antifungal and antibacterial effects (Scully, 2008).

Steps 71-72: Smoking is one of the factors that may increase dryness of the mouth and therefore efforts should be made to cease or to limit smoking. Pharmacists have the responsibility of recommending nicotine replacement products to aid smoking cessation. Joining smoking cessation groups is also appropriate (Scully, 2008).

Steps 73-74: Alcohol, like smoking, is another factor that may impact on oral dryness (Scully, 2008). If the patient is an alcohol abuser, he/she should be advised to stop consuming alcohol and to join alcohol support groups. Alcohol-based mouthwashes are also implicated (Scully, 2008).

Steps 75-78: Medication-induced xerostomia is one of the most commonly encountered causes. Elderly patients presenting at the pharmacy with dry mouth complaints, should have their medication profile, including prescription and non-prescription drugs, assessed to establish any polypharmacy. Patients should be referred to a general practitioner for adjustments since discontinuing unnecessary drugs may help in reducing polypharmacy, reducing side-effects, improving compliance and quality of life.

Step 79: Establishing the cause of xerostomia is essential in management of the condition. There are three major causes of xerostomia, namely psychogenic cause (refer to step 81), drug-induced (refer to step 86) or radiation-induced hyposalivation (refer to step 93).

Steps 80-84: When there is no identifiable cause of dry mouth, the cause is most probably psychogenic. The pharmacist should establish whether the patient is suffering from any forms of anxiety, stress or depression that may contribute to oral dryness. Management with both salivary substitutes and salivary stimulants is indicated, but referral to a general practitioner is essential to treat or manage the underlying condition.

Steps 85-90: When the onset is drug-related, the pharmacist must establish whether the patient recently commenced a new drug treatment or an increase in dose. The medication profile should be assessed as well, and referral to a general practitioner for adjustments may be required. Meanwhile, until the patient get dose or treatment adjustments, a salivary substitute or a stimulant may be dispensed to manage the symptoms.

There are many drugs that are associated with dry mouth, as per table 4 in section 3 of the booklet. Anticholinergic action is widely responsible for many drugs (Scully, 2003). Medicines are known to cause over 60% of cases of dry mouth, with more than 400 different medications that are known to cause dry mouth.

Steps 91, 93-94: When the cause is due to irradiation of salivary glands, the patient may be dispensed salivary substitutes. Salivary stimulants are not indicated in this scenario since these patients have their salivary glands destroyed by radiation.

Step 92: If the cause is neither psychogenic, drug-induced, nor irradiation of salivary glands, the patient should be referred to a general practitioner or a dentist to establish the cause. Other possible causes include salivary gland diseases, such as sarcoidosis, salivary aplasia, and parotidectomy.

Steps 95-98: Independent of the cause, the pharmacist should check whether any medication was previously used to treat the condition. If the medication is known and is suitable for use, the pharmacist should not find any problems in dispensing the same medication again. In scenarios where either no medication was previously used, the medication is not known, or medication is unsuitable, the pharmacist should proceed to step 99 - the treatment box.

Step 99: The following are possible treatment options of salivary substitutes and salivary stimulants available locally.

Some examples of salivary substitutes include:

- A formulation containing xylitol, glucose oxidase and lactoperoxidase, which are available as a gel and a mouthwash. This formulation replaces the constituents of saliva to replenish dry mouth. The enzyme formulations are multifunctional, as such they help supplement saliva's natural defences, help maintain the oral environment to provide protection against dry mouth and help supplement saliva's natural antibacterial system. Such formulations are alcohol-free, which help in preventing further dryness. The regimen recommended for optimal dry mouth relief is:
 - Morning: Rinse and gargle with mouthwash after brushing with a sodium lauryl sulphate-free, fluoride toothpaste.
 - Lunchtime and evening meal: A teaspoon of moisturizing gel prior to eating for patients with eating difficulties.
 - Bedtime: the same procedure as in the morning but an application of moisturising gel is recommended for patients who suffer from night-time dry mouth.
 - For additional relief, the gel can be applied as required.
- A combination of Xylitol and mineral salts as a spray formulation is available for immediate relief. This combination helps to restore the salivary balance, hydrates and refreshes the oral cavity, prevents the occurrence of oral conditions that may appear due to a decrease in salivary flow. This formulation is easy and convenient to use for the patient. It can be used as often as required, with two or three sprays directly into the cavity. It is advisable not to eat or drink until 15 minutes after its use.

A toothpaste is also available with a different combination of ingredients for effective protection. This formulation contains sodium fluoride which decreases the incidence of caries, xylitol which has a cariostatic effect and provitamin B5 and vitamin E, with a protective and antioxidant effect on gums. The teeth should be

brushed for 2 or 3 minutes, at least 3 times daily, preferably after every meal and before going to bed.

- Casein Phosphopeptide – Amorphous Calcium Phosphate is another formulation that helps relieve dry mouth symptoms and has a soothing effect. A generous amount of the gel should be applied over the buccal and lingual surfaces of the teeth and oral mucosal tissues, as often as required. This preparation has a neutral pH, meaning that effective symptomatic relief can be provided, whilst preserving oral pH within the safe range to prevent demineralisation.

Some examples of salivary stimulants include:

- Sugar-free chewing gum containing xylitol or sorbitol, which are to be used as required.
- Diabetic sweets also stimulate saliva production, and they are to be used as required.
- A combination of olive oil, betaine and xylitol increases unstimulated salivary flow rate, helps the natural saliva recover and protects enamel and dentin against demineralization and erosion. It is an alcohol-free range, containing different formulations, namely toothpaste, mouthwash, mouth spray, dental gums, pastilles and salivary substitutes. The manufacturer advises that for maximum effect, the toothpaste, mouthwash, mouth spray and salivary substitute should be combined. The toothpaste and mouthwash should be used 3 times daily after main meals, the spray is to be used as often as desired while the saliva substitute is to be applied as many times as desired over teeth, gums, tongue, lips and mucosa, especially before bedtime. Optionally, the dental gum and pastilles are to be taken as often as desired.

Pilocarpine tablets may be indicated for radiation-induced hyposalivation, but it should be withdrawn when no response is achieved in patients. It is vital to advise patients to maintain adequate fluid intake to avoid dehydration due to excessive sweating, and to drive and operate machinery with caution since blurred vision or dizziness may result (BNF No 58, 2009).

Step 100: This step contains possible advice that the pharmacist can give to patients presenting with dry mouth. Patients should avoid eating spicy foods, or hard, dry crunchy foods and to take small bites and eat slowly. Plenty of soft, creamy foods or cool foods with a high liquid content are preferred. Drinking water or non-alcoholic drinks with meals is recommended while juices and other fluids are to be sipped frequently throughout the day. Beverages that may cause diuresis, such as coffee and tea are to be avoided. Maintaining good oral hygiene is recommended to protect against dental caries and other complications, while the lips can be kept hydrated with a water-based or a lanolin-based product.

Steps 101-103: These steps ask whether the treatment was successful and therefore if the patient is receiving adequate treatment. The patient should be referred if he/she returns to the pharmacy demanding another product because there was no improvement in the symptoms.

Dental Abscess

Step 104: Dental abscess is a bacterial infection leading to accumulation of pus in dental structures, such as the teeth and gums. There are two types of dental abscess, namely periapical or periodontal. The most common type is periapical abscess and it occurs as a result of dental decay affecting the teeth. On the other hand, periodontal abscess is the collection of bacteria in the gums³. Usually different types of microorganisms are involved, commonly including anaerobic Gram-negative rods, oral *Streptococcus* spp. and *Enterobacteriaceae*⁴.

Steps 105-107: Patients presenting with any of the accompanying conditions in step 106 should be immediately referred. Severe pain despite using non-prescription products, the presence of fever, chills, nausea and vomiting, and spreading facial infection may indicate advanced infection, therefore require immediate treatment, either with antibacterials or drainage of pus (Balentine, 2009). Immunosuppressed patients and patients with uncontrolled Diabetes Mellitus require immediate referral since their immune system is weakened and may lead to further complications. Patients with cardiovascular prosthetics or patients suffering from any congenital or acquired heart diseases are at a greater risk of serious infections, such as endocarditis⁴.

Step 108: The pharmacist should establish the signs and symptoms presented in this step. The main symptom is pain and swelling of the mouth and face, the pain of which can be intense and throbbing. The acute pain usually worsens over a few hours to a few days, and it may spread to adjacent areas on the same affected side, such as the ear, lower jaw and neck. Other symptoms include persistent halitosis or bad taste, loose or shifting teeth and sensitivity to very hot or cold food and drink³.

³ National Health Service. Dental Abscess [serial online] 2010; [cited 2011 April 14]. Available from: URL: <http://www.nhs.uk/conditions/dental-abscess/Pages/Introduction.aspx>.

⁴ British Society for Antimicrobial Chemotherapy. Dental abscess [serial online] 2010; [cited 2010 December 21]. Available from: URL: <http://www.bsac.org.uk/>.

Steps 109-110: If the patient is a smoker, the pharmacist should advise him/her to stop smoking or to limit smoking as much as possible. It is one of the measures to avoid formation of dental abscesses. The patient should be recommended the use of nicotine replacement products and to join smoking cessation groups. Self-motivation is a key factor in the process of smoking cessation and determines whether or not the patient stops smoking successfully. Nicotine replacement therapy (NRT) has been found to be an effective treatment option. NRT products are available in different formulations, such as patches, chewing gum, lozenges and inhalators, and thus there should be an option to suit all patients (Nathan, 2006).

Steps 111-112: Practicing good oral hygiene is another measure to prevent formation of dental abscesses. Advice includes daily brushing and flossing and regular visits to the dentist, which is further explained on page 36 of the booklet.

Steps 113-115: Ideally the pharmacist should assess whether the patient tried to treat the condition at home. It may result that the patient is using medication not suitable for the condition, or maybe contra-indicated with regards to certain disorders, such as ibuprofen in asthmatic patients, or aspirin in children less than 16 years old due to occurrence of Reye's syndrome. Referral to a dentist is necessary in the above scenario⁴.

Step 116: This action box contains possible advice that the patient may adopt to help to reduce pain, such as rinsing mouth with warm salt water for a soothing effect (Rosenberg, 2010), avoid drugs that may cause irritation of the oral tissues, eating cool, soft foods and avoiding hot or cold food and drink. Nonetheless, advice should be complementary to pharmacotherapy.

Step 117: This decision box separates patients according to age. For children under 12 years, steps 118-120 should be followed, whereas steps 121-123 should be followed for adults. Treatment boxes include analgesics – paracetamol and non-steroidal anti-inflammatory drugs (NSAIDs). Routinely prescribed antibiotics are also indicated but it is important to emphasise that referral to a dentist is necessary to manage a dental abscess.

Step 118: Paracetamol is the first line of treatment when compared to NSAIDs. The different formulations available include film-coated tablets, effervescent tablets, oral suspension and suppositories. The dose in children varies according to body weight - 15-20mg/kg orally four times daily, or 30mg/kg rectally as a single dose. NSAIDs, such as ibuprofen, which is available as tablets and oral suspension are also indicated and dose varies according to body weight, with 5-10mg/kg every 8 hours.

Steps 119-120: A dentist may recommend one of the following treatment options. The combination of amoxicillin and metronidazole, or the single preparation of spiramycin with metronidazole are the most commonly prescribed. Amoxicillin is available as tablets, capsules and oral suspension whereas metronidazole is available as tablets and oral suspension. The recommended dose is amoxicillin 15-25mg/kg/dose three times daily, and metronidazole 10mg/kg/dose three times daily. The recommended dose of the combination of spiramycin and metronidazole is 2 tablets daily for children between 6-10 years (i.e. 1.5 MIU of spiramycin and 250mg of metronidazole) and 3 tablets daily for children between 10-15 years (i.e. 2.25 MIU of spiramycin and 375mg of metronidazole)

For beta-lactam resistant organisms, co-amoxiclav therapy is indicated and the maintenance dose is 22.5mg/kg/dose twice daily. Both tablets and oral suspension are available. Finally in patients allergic to penicillin, clindamycin capsules are indicated and the dose is 10mg/kg/dose three times daily.

Step 121: The same medications apply for adults, with a difference in the dosage regimen. 0.5-1g of paracetamol is indicated four times daily, while NSAIDs such as ibuprofen may be taken as 300-400mg three to four times daily.

Other NSAIDs indicated for dental pain are diclofenac and aspirin and thus the choice of analgesia should be based on its suitability for the patient. The use of opioids is limited since they are relatively ineffective in dental pain and may cause unpleasant side-effects. Combinations of opioid with non-opioid analgesics may be indicated but the risk-benefit ratio should be analysed carefully (BNF No 58, 2009).

Steps 122-123: A dentist may prescribe one of the following treatment options. The dose of amoxicillin increases to 250-500mg while that of metronidazole increases to 200mg over the paediatric dose, to be taken 8-hourly with meals for 3-7 days. Food may decrease the occurrence of gastrointestinal irritation, and thus improves compliance. The recommended regimen for the combination of spiramycin and metronidazole is 4-6 tablets daily (i.e. 3-4.5 MIU of spiramycin and 500-750mg of metronidazole) in 2-3 divided doses. The dose of co-amoxiclav increases to 375mg three times daily for 5 days, while the recommended maintenance dose of clindamycin is 150-300mg four times daily for 5 days.

Antibacterial drugs should only be prescribed in oral infections on the basis of a confirmed diagnosis. If no improvement is seen within 48 hours of antibacterial use, the antibacterial should be changed. This may occur due to incorrect diagnosis, poor host resistance and poor patient compliance, amongst other factors (BNF No 58, 2009).

References

- Azzopardi LM. Validation instruments for community pharmacy: pharmaceutical care for the third millennium. Binghamton: Pharmaceutical Press; 2000.
- Azzopardi LM. Lecture notes in Pharmacy Practice. London: Pharmaceutical Press; 2010, pp. 193, 357-8.
- Balentine J. Dental Abscess. WebMD [serial online] 2009; [cited 2009 August 12]. Available from: URL: http://www.emedicinehealth.com/dental_abscess/page1_em.htm.
- Blenkinsopp A, Paxton P. Symptoms in the pharmacy: a guide to the management of common illness. England: Wiley-Blackwell; 2002.
- Cawson RA, Odell EW. Cawson's Essentials of Oral Pathology and Oral Medicine. Edinburgh: Elsevier; 2002.
- Edwards C, Stillman P. Minor illness or major disease?: the clinical pharmacist in the community. Binghamton: Pharmaceutical Press; 2006.
- Gallagher RM, Gallagher HC. Improving the working relationship between doctors and pharmacists: is inter-professional education the answer? Adv Health Sci Educ Theory Pract 2010; doi: 10.1007/s10459-010-9260-5.
- Huffines RF. Dry mouth and Dentures. Geriatric Dentistry [serial online] 2007; [cited 2011 May 1]. Available from: URL: www.geriatricdentistry.com/dry%20mouth%20dentures.pdf.
- Joint Formulary Committee. British National Formulary. 58 ed. London: British Medical Association and Royal Pharmaceutical Society; September 2009.
- Mann H. Aphthous Ulcers checklist. BMJ 2009; 339: doi:10.1136/bmj.b2382.
- Mayo Clinic staff. Reye's syndrome. Mayo Clin Proc [serial online] 2009; [cited 2011 May 1]. Available from: URL: <http://www.mayoclinic.com/health/reyes-syndrome/DS00142>.
- McLeod I, Crighton A. Practical Oral Medicine. United Kingdom: Quintessence Publishing; 2006.
- Mosby's Medical, Nursing & Allied Health Dictionary, 6th edn. St Louis: Mosby; 2002.
- Nathan A. Non-prescription Medicines. London: Pharmaceutical Press; 2006, p.294.

- Rosenberg JD. Tooth abscess. PubMed Health [serial online] 2010; [cited 2011 March 28].
Available from: URL: <http://www.ncbi.nlm.nih.gov/pubmedhealth/PMH0002055/>.
- Scully C. Drug effects on salivary glands: dry mouth. *Oral Diseases* 2003; 9: 165-176.
- Scully C. *Oral and maxillofacial medicine: the basis of diagnosis and treatment*. Edinburgh: Elsevier Churchill Livingstone; 2008.
- Winfield AJ, Rees JA, Smith I. *Pharmaceutical Practice*. Edinburgh: Elsevier Churchill Livingstone; 2009.