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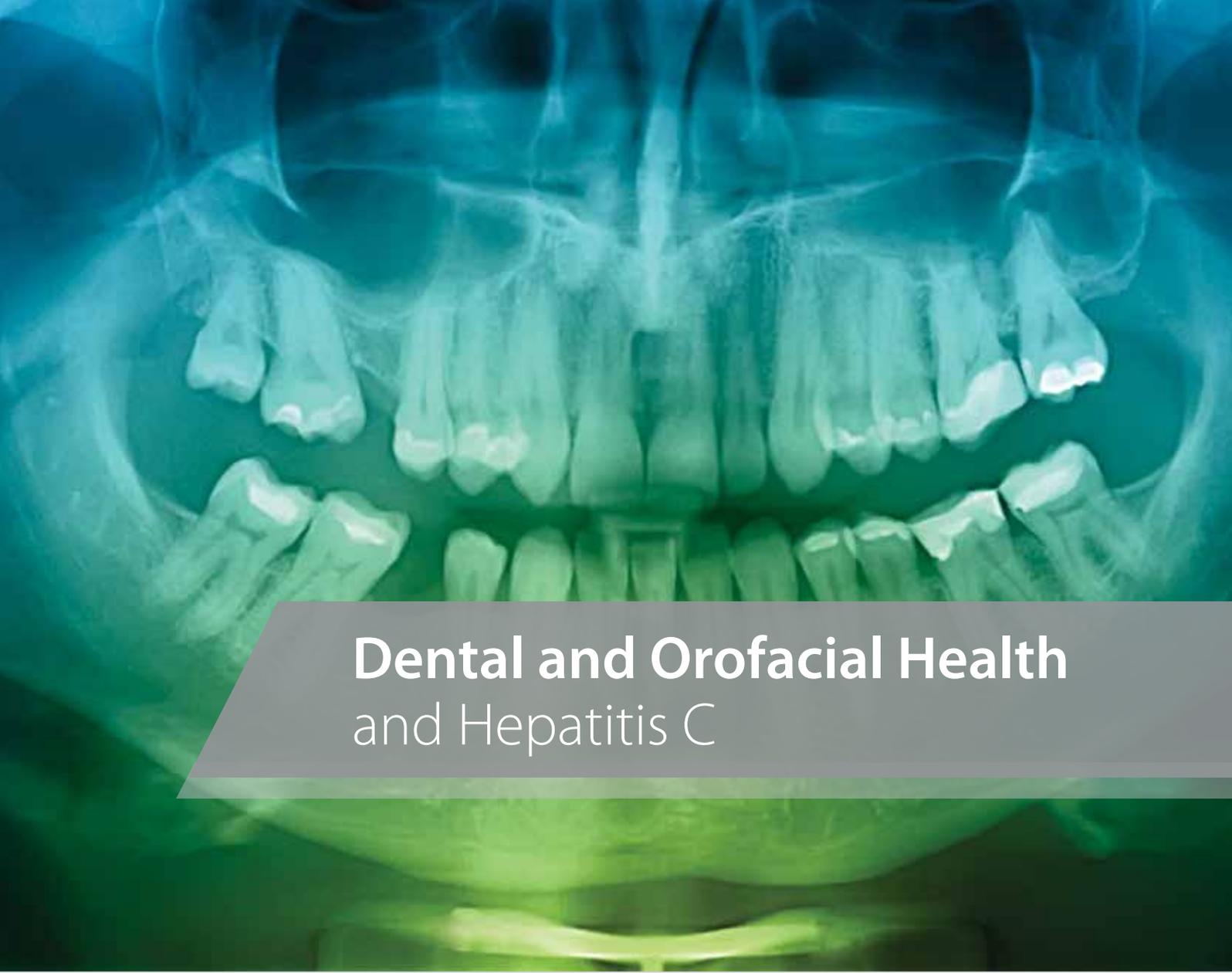
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Dental and Orofacial Health and Hepatitis C



Over the past decade, hepatitis C virus (HCV) has been one of Australia's most commonly notified infectious diseases. By the end of 2010, it was estimated that 297,000 people living in Australia had been exposed to the virus, of whom 221,000 were living with chronic HCV infection.¹ The number of diagnoses of HCV infection is estimated at approximately 10,000 per year.¹

This resource is written for dentists to provide an overview of the oral manifestations and complications associated with HCV infection and treatments.

Chronic HCV infection can cause long-term liver problems, including cirrhosis and hepatocellular carcinoma (HCC). Despite a greater understanding of HCV infection, there is still no vaccine for HCV and treatment is a lengthy process with a variable rate of cure. Prevention of transmission depends on decreasing exposure to infected blood and blood products.

In providing effective dental care to people infected with HCV, the first step is to understand the virus and the potential health and dental health problems associated with hepatitis C infection. It is also important that issues of infection control, prevention of disease transmission and the broader health implications of providing dental treatment for people with serious liver problems are properly understood.

Hepatitis C

Incidence and disease burden

In 2011, the World Health Organization estimated 130–170 million people globally to be chronically infected with HCV.² Each year, it is estimated that 3–4 million people are newly infected with HCV and over 350,000 people die from HCV-related liver diseases.² Hepatitis rates vary widely by region and sub-population.

By the end of 2010, it was estimated that 297,000 people living in Australia had been exposed to the virus, of whom 221,000 were living with chronic HCV infection.¹ The rate of HCV infection diagnosis has declined from 58.6 to 50.1 per 100,000 between 2006 and 2010.¹ It is estimated that around 54,100 infected individuals are living with moderate to severe liver disease or cirrhosis, with more than 200 reported cases of liver failure and more than 100 cases of HCC due to HCV.¹

The Virus

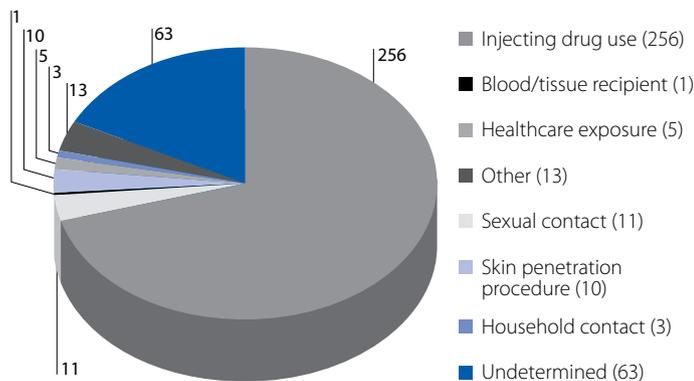
The HCV is an enveloped, single-stranded positive-sense ribonucleic acid (RNA) virus,³ that belongs to the Hepacivirus genus in the virus family *Flaviviridae*.⁴ The HCV displays high genetic diversity with six different genetically distinct viral groups or clades and different subtypes.^{5,6} The most common genotypes (G) in Australia are G1, G1a, G1b and G3.⁷ Currently, genotype is the best predictor of treatment responsiveness but new treatment agents will change this.

Transmission

Hepatitis C is a blood-borne virus. Food, water or casual contact are not methods of transmission of HCV,¹ and it is well established that the primary risk factor for HCV transmission is exposure to infected blood.⁸

The routes of transmission of HCV in Australia can be seen in Figure 1. In 2010, the majority of people with HCV were exposed to the virus by injecting drug use in Australia.¹ Contact with injecting equipment such as tourniquets, spoons and water contaminated with blood or when reusing snorting devices are other ways HCV can be transmitted.⁹ Exposure to HCV can occur through unsterile tattooing or body piercing, via a penetrating injury such as a needle-stick injury.⁹ The risk of HCV transmission by sexual contact is considered low.¹⁰ Sexual transmission of HCV is increased by unsafe sex, high-risk sexual behaviours, and in the presence of other sexually transmitted infections, in particular Human Immunodeficiency Virus (HIV).¹¹ Transfusion

Figure 1: Number of diagnoses of newly acquired HCV infection in 2010 by exposure. (Modified from *HIV, viral hepatitis and sexually transmissible infections in Australia Annual Surveillance Report 2011 table 2.1.13*)¹



of blood or a blood product is a risk factor for HCV infection.¹⁰ In Australia, all blood or blood products are tested for HCV and have been since 1990 and so the risk of HCV infection from blood transfusion is almost nil.¹⁰ However, individuals from developing nations, where untested blood and blood products are still being used, should be offered testing. Transmission of the HCV by saliva alone is a remote possibility but risk increases if the saliva is contaminated with blood.¹² Household transmission through items such as razors or toothbrushes is considered rare. However, considering the possibility of blood contamination, these items should not be shared.¹³ Vertical transmission from mother to child occurs in 5% of cases,¹⁴ but it does not account for a large percentage of new HCV diagnoses in Australia.¹ Breastfeeding should not be discouraged and is regarded as safe, unless cracked nipples allow blood contact.¹⁰ Hepatitis C infection may be asymptomatic for many initially and chances are that they may unknowingly infect others through the known routes of transmission.

Testing for Hepatitis C Infection

Testing for HCV includes detecting 'antibodies' to the virus (HCV Ab) or viral RNA in the blood. There is a window period of 2 – 4 weeks after initial infection for the HCV RNA (and it may take 2 – 6 months) for the HCV Ab to be detectable.

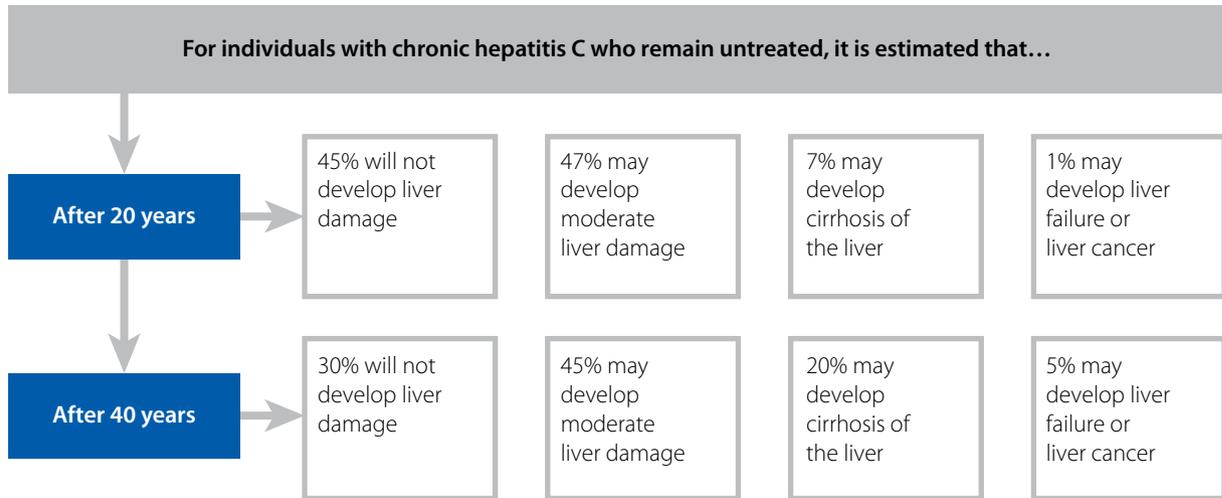
Testing is usually undertaken by a medical practitioner. Testing should only be performed after an open discussion and the provision of informed consent, and any results should be given to the patient in person. (See the *2012 National Hepatitis C Testing Policy* for more information at www.testingportal.ashm.org.au.)

Presentation, Progression and Prognosis

Natural History

Acute hepatitis causes symptoms in a minority of cases at the time of infection, but most people will remain asymptomatic. Symptoms include fatigue, nausea, headaches, psychiatric disorders, upper abdominal pain and changes in appetite.¹⁵⁻¹⁷ Figure 2 illustrates the natural history of HCV infection. Once infected with HCV, between 25% and 45% of people will clear the virus within 12 months (usually 3–6 months) after initial

Figure 2: The natural history of chronic hepatitis C infection. (Adapted from G Dore/Hepatitis NSW – 2012)¹⁸



infection. Those who do not clear HCV are described as having chronic hepatitis C infection. After 20–40 years some patients will experience progressive liver fibrosis and may develop signs and symptoms of cirrhosis, liver failure or liver cancer.

Figure 2 shows the different potential outcomes for untreated chronic hepatitis C. It does not show the outcome for individual people. Factors such as alcohol intake, age when HCV was acquired and current level of inflammation may influence the outcome.

Chronic HCV infection tends to have nil or minimal symptoms.^{17, 19, 20} Affected individuals may complain of nausea, anorexia, itching and weight loss; however, these symptoms are nonspecific, mild and intermittent.¹⁷ Those with chronic hepatitis C most commonly complain of fatigue and malaise, and these symptoms mainly account for a compromised quality of life.¹⁵ HCV is monitored by liver enzymes such as alanine aminotransferase (ALT) and these may fluctuate throughout the course of the disease, being normal at times.¹⁷

Progressive fibrosis from ongoing inflammation results in cirrhosis. Not only do these changes affect the function of the liver but also blood flow through the liver is impaired and can cause portal hypertension and its sequelae. Compensated cirrhosis is generally asymptomatic but once the complications of cirrhosis occur the patient is said to have decompensated cirrhosis or end-stage liver disease (ESLD).^{17, 21} The main manifestations of decompensated cirrhosis are ascites, bleeding varices, encephalopathy and coagulopathy.^{21, 22} As with all chronic and advanced

liver disease, patients will have low platelet counts, impaired coagulation factor production and altered drug metabolism which need to be taken into account when treatment planning.

Chronic HCV infection is linked with many extra-hepatic diseases, and in some cases the association is strong while in others the exact relationship remains controversial.²³ A recent large case-control study found a significant association between chronic hepatitis C infection and porphyria cutanea tarda, lichen planus (LP), vitiligo, cryoglobulinaemia, membranoproliferative glomerulonephritis, and Non-Hodgkin's lymphoma (NHL).²⁴ Many more diseases have been associated with chronic HCV infection but only the orofacial manifestations will be covered in this review.

Twenty-five percent of the liver transplants performed in 2010 were for liver disease caused by HCV, this is eightfold more than for hepatitis B.¹ Currently, HCV-associated cirrhosis represents the leading primary indication for liver transplantation in Australia.²⁵

Summary of HCV Profile

Virus	Profile	Transmission	Vaccination	Treatment	Notifiable
Hepatitis C virus (HCV)	Hepatitis C infection is likely to become a chronic condition in 70%–80% of people exposed to HCV. Approximately 10% of cases will develop severe liver disease after 20 years.	Transmitted when infected blood enters the bloodstream of another person (blood-to-blood contact). It is uncommon for HCV to be transmitted by sexual activity or through mother-to-child transmission. Hepatitis C is not transmitted by food or water contamination.	None for HCV. To prevent the complications of co-infection, people with HCV infection should be vaccinated against hepatitis A and B.	Antiviral therapy and modifying risk factors	Yes

Hepatocellular Carcinoma (HCC)

Hepatic carcinogenesis during chronic HCV infection is a complex multi-factorial process. HCV does not integrate into the host genome, so it is theorised that HCV induces HCC through the indirect mechanisms of chronic inflammation, proliferation and necrosis.²⁶ It is for this reason that HCC is almost exclusively found in cirrhotic HCV patients.²⁶ Overall, HCC has a poor prognosis, with 5-year survival of less than 11%.²⁶

Treatment

Current Treatment Approaches for HCV

The current standard of care for HCV infection is an initial full clinical and liver assessment followed by an ongoing treatment program. It is important to define the type of HCV infection in terms of genotype and viral load, as well as the severity of liver disease and the stage of fibrosis which is assessed by liver tests, ultrasound, fibroscan and liver biopsy if indicated.

Patients with evidence of active disease and progression to a fibrotic stage of the disease do need to be offered treatment. In Australia at present, the standard treatment remains pegylated interferon and ribavirin. Pegylated interferon and ribavirin deliver a clearance rate from 45–80% depending on a range of factors including genotype, viral load and presence of fibrosis. These two antiviral agents work together to decrease viral replication and increase host immune response to the virus. New protease inhibitor drugs are becoming available in Australia. These new drugs have improved clearance rates, and shortened treatment duration. Side effects and drug interactions (factors leading to a relatively low uptake of treatment at present) are still a concern with the new agents. For many patients, waiting for newer treatment options while being regularly monitored is reasonable and many patients are choosing this option.

Figure 4a: Dental deterioration in a young HCV patient with dental neglect



(Photographs courtesy Dr E Coates, South Adelaide Dental Service)

Side Effects of HCV Treatment

HCV treatment is generally well tolerated. However, current therapy is associated with a range of side effects, which in some are severe enough to lead to treatment cessation.²⁷ These include more commonly experienced side effects such as irritability, dermatitis skin, hair loss, anorexia, nausea, headaches, fever, myalgia, neutropaenia, thrombocytopaenia, and anaemia. Less common side effects include those such as psychiatric disorders, diabetes, and thyroid dysfunction.^{16, 28}

Reported oral side effects after interferon and ribavirin treatment include gingival bleeding, gingival swelling, toothache, gingivitis, periodontitis, dental caries, cheilitis, taste changes, dry mouth, glossitis, glossalgia, perioral parasthesia, oral pain, oral mucosal damage, oral lichen planus, oral haemorrhage, dry lips and bulla of the lips.²⁹

Dental Treatment of Hepatitis C and Related Oral Conditions

Dental Complications

People with hepatitis C are prone to tooth decay, suffer loss of self-esteem due to poor oral aesthetics and have difficulty with diet due to poor oral health, all leading to a compromised quality of life. An effective preventive care programme for a patient diagnosed with HCV is critical and should be an important goal for the dental practitioner.

Dry Mouth

Studies have shown that there is an increased incidence of dry mouth in patients with HCV infection, especially those patients on antidepressants, in addition to the known effects of HCV on salivary glands.^{12, 30}

Saliva has many roles including: lubrication, cleaning, buffering, remineralisation, moisturising, immunological defence against bacteria and initiation of digestion.

Salivary depletion may result in:

- Dental caries
- Altered taste
- Burning sensation in the mouth
- Candidiasis
- Halitosis (bad breath)
- Difficulty chewing, swallowing and talking
- Difficulty wearing dentures
- Dry mouth and lips
- Sialadenitis

Figure 4b: Dental deterioration in an older HCV patient



Management of Dental Complications of HCV

Management is aimed at the prevention of damage to the dentition, improving symptoms and increasing salivary flow and includes:

- Education and oral hygiene
 - Patient education on oral hygiene techniques including regular tooth-brushing with fluoridated toothpaste, and flossing
 - Products that are sodium laurel sulphate-free (non-foaming) and of mild flavours may be less irritating
 - Avoid using mouthwash containing alcohol, use a pH balanced oral rinse instead
 - The use of fluoridated dental products including mouth-rinses and toothpastes
 - Remineralisation products containing casein phosphopeptide and amorphous calcium phosphate (CPP-ACP)
 - Measures required to minimise the impact of the dry mouth on oral health such as dietary analysis and advice on reducing the frequency and amount of carbohydrate intake
 - Maintaining optimal denture hygiene is important and requires regular brushing and soaking in chlorhexidine or dilute bleach solution
 - Encourage smoking cessation and a reduction in intake of coffee and tea.
- Professional care
 - Regular dental examinations
 - Fluoride supplementation is important and may involve: the use of a prescription-strength neutral fluoride gel in custom-made fluoride trays depending on the reduction of saliva and degree of caries risk
 - Management of candidiasis with topical agents, avoiding those containing sugar if dentate³¹
 - Medications may increase dryness; changing medications or altering the dose (if possible) may improve dryness
 - Pilocarpine may be used to increase salivary flow but it has significant side effects and its use is contraindicated in many medical conditions and with a number of medications.³² Use of pilocarpine is best in the hands of medical practitioners or dental specialists.
- Moisture replacement
 - Saliva stimulation by chewing sugar-free gum
 - Moisture replacement by the sipping of water to improve lubrication and hydration
 - Saliva substitutes can provide some moisture replacement and protection of tissues but benefits are usually short-lived
 - Lanolin and papaya products are useful for dry lips
 - Humidified air at night may alleviate some symptoms in dry wintery conditions

Liver Disease in HCV

Hepatitis C may cause liver damage with a corresponding reduction in liver function. The most important liver functions that have implications in the provision of dental treatment by dental healthcare providers are drug metabolism and production of clotting factors (V, VII, and IX, X, prothrombin and fibrinogen). All patients should have a detailed medical history taken and the dentist should consult with the patient's medical practitioners to ensure that a safe and appropriate dental treatment plan is established in light of the liver dysfunction. A detailed clinical evaluation involving extra-oral and intra-oral examinations may pick up signs of liver disease.³³ Liver disease is often associated with a reduction in clotting factors, which results in an impaired haemostasis. In a patient with liver disease, the risk for the dentist is related to the extent of the liver disease, medications, the type of dental treatment planned and the presence of co-morbidities.³³ Invasive treatment should be avoided for patients with acute liver failure and acute hepatitis. Emergency treatment should be provided in a hospital setting.

Management of Liver Disease in Dentistry

If invasive treatment is planned, the following blood tests may be required:

- Complete blood exam
- INR (> 1.7 indicated a serious risk of bleeding for a non-warfarinised patient)³⁴
- Coagulation tests (prothrombin time, activated partial thromboplastin time)
- Liver function tests (Aspartate aminotransferase (AST) and Alanine aminotransferase (ALT))

If test results are significantly abnormal then any dental treatment must be provided only after consultation with either the relevant medical specialist, or by referral to a dental specialist in oral medicine or oral and maxillofacial surgery. Hospital-based care may be required depending on patient factors and the nature of the proposed treatment.

Local haemostatic measures may be necessary, including compression, sutures, dressings such as oxidised cellulose, and antifibrinolytic agents such as tranexamic acid. Pre-operative optimisation with vitamin K therapy or transfusions may be necessary. Where immune impairment is present, antibiotic prophylaxis may be necessary.³³ Attention should be paid to minimisation of surgical trauma.³⁵

Hepatitis C Infection Related Oral Diseases

Lichen Planus

Lichen planus (LP) is a chronic mucocutaneous disease more commonly seen in middle-aged women and affecting up to 1-2% of the population.³⁷ There is some evidence of an association between HCV and oral lichen planus (OLP); however, this varies by region.²³ A 2004 systematic review of the association between LP and HCV showed that individuals with LP are more likely to have anti-HCV antibodies, odds ratio 4.80 (95% Confidence Interval CI: 3.25-7.09).³⁸ OLP is often bilateral and typically presents as a mixture of clinical subtypes that characteristically bear fine white striations known as Wickham's striae. The reticular form has a lacy pattern of white lines while the papular type consists of small raised areas. The plaque-like variant appears similar to a leukoplakia. The atrophic form presents with erythematous patches. The erosive variant appears deep red in colour while the ulcerative type appears as irregular and often large ulcerations. Bullous type is extremely rare and often presents as either erosive or ulcerative due to ruptured bullae. If affected on the gingivae, it often appears as erythematous and is called desquamative gingivitis (see figure 5). Common symptoms are of burning or oral pain, especially with acidic or spicy foods. Symptoms are often irrespective of

the clinical presentation. LP is a cutaneous disease with oral, genital and skin lesions, most commonly on the flexor surfaces. The typical clinical course of OLP is chronic with periods of exacerbation associated with stress and quiescence.³⁹ The exact pathogenesis of LP is not fully understood; however, there is increasing evidence it represents immune dysregulation mediated by the cellular immune system in a process resembling a hypersensitivity reaction.⁴⁰

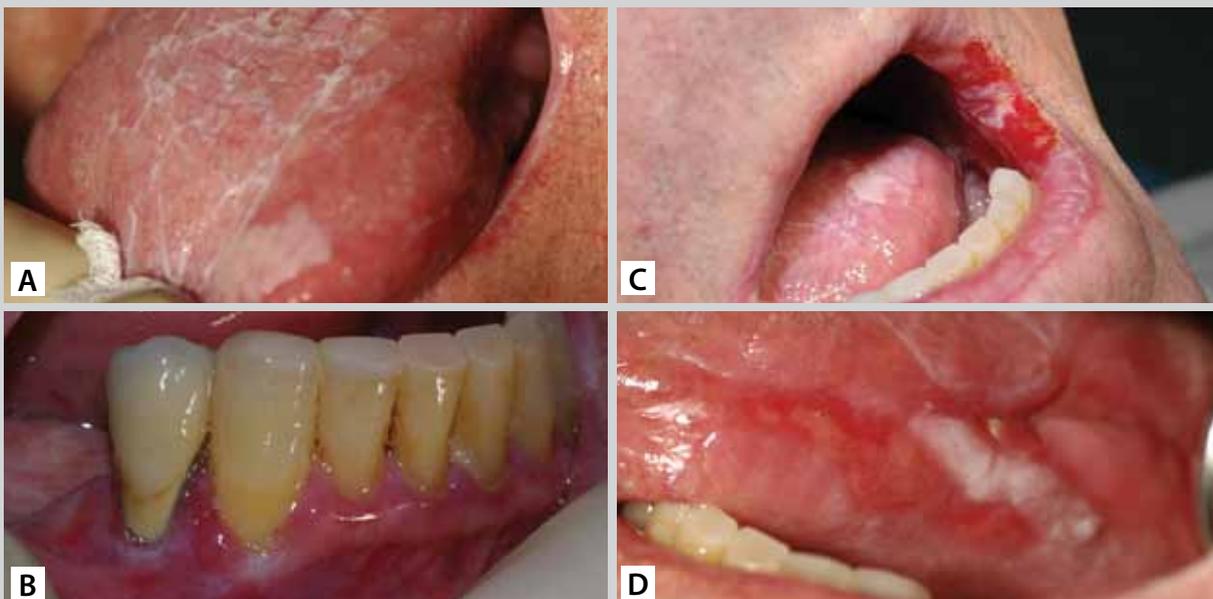
OLP can be exacerbated by stress and candida,³⁹ oral hygiene,⁴¹ dental materials,³⁹ and medications.⁴² OLP is thought to be associated with oral cancer; however, the evidence must be viewed with caution. A recent review of the literature found the malignant transformation rate of OLP to be around 1% over 5 years.³⁹

Diagnosis of OLP should involve a referral to a trained clinician in oral medicine or maxillofacial surgery. A referral should include a complete history, physical examination and biopsy results if taken. Biopsy specimens should be sent for histopathology, including immunofluorescopy. The principles behind treatment of OLP are immune modulation, symptom management, education and monitoring. Treatment of OLP is usually reserved for symptomatic disease. There are a number of treatments that can provide control of OLP but the mainstay is topical corticosteroids.⁴³ At this stage there is no cure.⁴⁴ Treatment is usually managed by trained dental specialists or medical practitioners.

Treatment of Oral Lichen Planus

Topical Corticosteroids: Betamethasone dipropionate 0.05% ointment. Apply sparingly to lesion twice a day after meals. (Topical corticosteroids should not be used continuously for more than 3 weeks without specialist advice.)

Figure 5: A series of photographs showing exacerbation of lichen planus from a single patient with HCV-associated cirrhosis undergoing PEG IFN/RBV therapy. The images show A) reticular and plaque-like; B) desquamative gingivitis; C) erosive over the corners of the mouth and plaque-like on the dorsum and D) erosive and ulcerative over the lateral border of the tongue



(Photographs courtesy Dr B Scopacasa, South Australia Dental Service)

Sjogren's Syndrome and Sialadenitis

It is known that HCV affects the salivary glands but the exact nature of this effect is yet to be fully understood. Hepatitis C virus is thought to cause a syndrome with features similar to Sjogren's Syndrome (SS) in a proportion of infected individuals.^{45,46} It has been proposed HCV may lead to the development of SS; however, this link is contentious.⁴⁵ The dental implications of this disease process are related to the effects of hyposalivation (see figure 6), which is discussed below.

Figure 6: Image of patient with HCV and Sjogren's Syndrome. There is hyposalivation, and teeth are worn, chipped and decayed.



(Photograph courtesy Dr E Coates, South Australia Dental Service)

Investigation of HCV-associated sialadenitis and SS is complicated and should be left to medical specialist such as a rheumatologist or a dental specialist, in particular an oral medicine specialist. The histopathology of chronic HCV-associated sialadenitis and primary SS are similar, with a general picture of inflammation and lymphocytic infiltration in the salivary tissues, but they are not identical.⁴⁷ A number of studies have detected the HCV in salivary glands.⁴⁵ However, it was not possible to correlate xerostomia, hyposalivation and sialadenitis with detection of HCV RNA in saliva or salivary glands.⁴⁸ The exact pathogenesis of HCV-associated sialadenitis is uncertain. Treatment of HCV can improve the clinical salivary abnormality but it is not clear if the improvement is related to virological clearance or to the medications themselves.⁴⁹ Strategies to treat the effects of HCV-related salivary gland dysfunction are described in the section on Management of dental complications of HCV (page 5).

Lymphomas

Non-Hodgkin's Lymphoma (NHL) comprises a heterogeneous group of haematological malignancies that can arise in lymph nodes or extranodal sites. There is a variable natural history, from indolent to aggressive, depending on tumour and host factors.

The head and neck region is the second most common place for extra-nodal NHL to occur, with lesions commonly arising in Waldeyer's Ring, salivary lymph nodes or the salivary gland parenchyma itself.⁵⁰ Clinical presentation varies on the site and type of NHL but commonly it manifests as a mass, which may ulcerate.

Lesions can occur in bone and cause swelling, neurological symptoms and loosening of teeth (see figure 7). There can be systemic symptoms that include painless swelling of lymph nodes, fever, night sweats, fatigue, weight loss, skin rashes and pain. A recent meta-analysis found that the pooled relative risk of NHL in individuals affected with HCV as 2.5 (95% CI, 2.1-3.0), which is low.⁵¹ The exact way HCV infection leads to the development of lymphoma is not clear but multiple mechanisms have been reported.

Diagnosis and treatment should be by a multi-disciplinary team, and care should be carried out in specialist treatment centres. There are two main modalities of treatment, radiotherapy and chemotherapy, but sometimes the disease may be closely monitored but not treated.⁵⁰ In the treatment of NHL, especially head and neck disease, it is important to be mindful of the orofacial side effects that can occur with these treatments, such as mucositis, osteoradionecrosis and radiotherapy-induced salivary gland dysfunction.

Figure 7: Oral lesion of Non-Hodgkin's lymphoma



(Photograph © ASHM)

Hepatitis C Treatment – Sequelae and Management

Prior to treating HCV it is important that any active dental disease be managed. Non-urgent dental treatment may need to be postponed until HCV treatment has ceased. Unfortunately, dental problems are known to delay the onset of treatment for HCV.²⁹ Dental treatment during anti-HCV therapy should be undertaken following consultation with medical specialists. Blood tests and further investigations may be appropriate and in some cases in-patient care may be required. Immunocompromised patients, particularly those with neutropaenia, are at risk of sepsis. If emergency dental treatment is necessary, consultation with medical specialists is recommended. If the patient is anaemic, coagulopathic or thrombocytopenic precautions may be needed. Pre-treatment optimisation and comprehensive post-operative care may be required. Particular attention must be given to haemostasis.

When prescribing medication to patients on anti-HCV therapy it is important to be mindful of potential drug interactions. During treatment patients may suffer depression, and associated motivation issues can affect their oral hygiene and compound their (often compromised) oral health problems. Most importantly, a rigorous preventive program at the start of HCV treatment should be initiated where possible.

Preparation for Liver Transplantation

Patients being readied for liver transplantation must have a dental and oral medicine consultation. Certain orofacial complications such as oral mucositis and opportunistic infections are expected with organ transplantation and these are usually managed in phases (pre-transplantation, peri-transplantation (during) and post-transplantation/supportive care). Active dental disease that could cause disseminated infection such as abscessed teeth and advanced periodontal disease should be treated prior to transplantation. This is because the conditioning regimes and post-operative immunosuppressant therapy decrease the patient's ability to resist infection which may compromise the survival of any organ transplant recipient.⁵² Supportive care is usually performed in a hospital setting by trained dental specialists in liaison with the liver transplant team due to the severe impairment of liver function. The treatment aims of supportive care are to:

- Eliminate or stabilise sites of oral infection⁵³
- Extract unrestorable teeth
- Provide oral hygiene instruction so the transplant recipient can maintain their oral health.

After the transplantation no elective treatment should be carried out for 3–6 months.³⁶ Treatment post transplant should only occur after consultation with patient's specialist as to the need for antibiotic prophylaxis and their ability to tolerate dental treatment and medications.⁵³

Discrimination

Australian Commonwealth law prohibits discrimination against someone with an infectious disease, unless the discrimination can be shown to be necessary to protect public health.⁵⁴ In addition, most states and territories have laws in the same terms as the Commonwealth law. Healthcare workers should respect the rights of people with hepatitis C. HCV is not a disease requiring additional precautions beyond standard precautions therefore patients with HCV must not be treated differently.

Hepatitis C is a highly stigmatised condition and many people living with the disease experience discrimination. Behaviours which reflect stigmatisation of a patient can also reduce the standard of healthcare received and lower the quality of life for people with hepatitis C and should be avoided. Such behaviours include:



Prescribing Medications in HCV-Associated Liver Disease

Most analgesics, antibiotics and local anaesthetics are well tolerated by the patient with early stage liver disease. However, where liver disease is advanced it may be necessary to reduce the dose or avoid some medications completely:

- Erythromycin and metronidazole inhibit the cytochrome P450 liver enzyme resulting in delayed metabolism of other drugs and can cause direct damage to liver tissues. Tetracycline may also cause liver damage. Tetracyclines should not be used.
- Metabolism of clindamycin is prolonged.
- Aspirin and non-steroidal anti-inflammatory drugs (NSAIDs) may increase the risk of gastrointestinal bleeding. They are metabolised in the liver and should be avoided.
- Paracetamol should be avoided where there is advanced liver disease and should not be prescribed if alcohol abuse is identified.
- Benzodiazepines should have a lower dose with a longer interval between doses for patients with liver disease. Sedatives and opiates may trigger encephalopathy.³⁶
- Amide local anaesthetics are metabolised in the liver and should be used cautiously as toxicity may occur with severe liver disease. Articaine is initially metabolised in the serum and therefore toxicity may be less of a problem.³⁴
- Ketoconazole and fluconazole are also metabolised in the liver and should be avoided.
- General anaesthetics and IV sedation should only be carried out in a specialist hospital unit.



- Breaches of confidentiality and disclosure related to hepatitis C, even among healthcare workers
- Assumptions about how people acquired hepatitis C
- Assumptions about people's past or present drug use.⁵⁵

Avoiding Discrimination

Healthcare workers should respect the rights of people with hepatitis C, regardless of how they were infected. Everyone living with hepatitis C should have access to care and services regardless of transmission route, gender, race, culture, sexual orientation or lifestyle issues (such as injecting drug use).

Discrimination and stigmatising behaviours can be avoided by:

- Ongoing health care worker education and continuing medical education
- Ensuring standard infection-control procedures are followed, thus reducing the need for disclosure or differential treatment
- Ensuring people's privacy and confidentiality are protected

Infection Control

Standard Precautions

Standard precautions are recommended for the care and treatment of all patients, regardless of their perceived or confirmed infectious status, and in the handling of all body fluids, non-intact skin and mucous membranes.

Needle-Stick Injury and Blood Spills

The risk of HCV transmission through a needle-stick injury from a known source depends on the viral load of the source patient, the first aid administered and the instruments involved. See Appendix (page 11).

Immediate Management of a Needle-Stick Injury⁵⁶

- Wash your skin with soap and water at the site of exposure, then cover
- Rinse your mouth, nose and eyes well with water or saline, if exposed
- Report the incident and follow your local workplace Occupational Exposure Protocol
- If further assistance with the management of a needle-stick injury is needed then contact your local health department and Hepatitis C Council for information and support.

Healthcare Workers with Hepatitis C

According to the Dental Board of Australia, under s.39 of the *Health Practitioner Regulation National Law Act* every dental practitioner and student must know their infection status for blood-borne viruses, and, if infected, seek appropriate expert advice, for example expert medical advice or advisory panel if diagnosed with a blood-borne virus and cease to perform exposure-prone procedures if viraemic.

Advice to Patients

Individuals infected with HCV should be advised not to share sanitary and household items which may carry traces of blood, such as toothbrushes, razors, shavers, dental floss or barber's hair-cutting equipment, and not to reuse injecting or snorting equipment.

Referral

A dental practitioner must follow the guidelines as above and if he/she is unable to manage the oral healthcare of a patient with HCV infection, a referral should be offered. There are many referral options depending on the geographic location and needs of the individual patient. Referral can be made to an oral medicine specialist, oral and maxillofacial surgeon or general dentist with experience in HCV; otherwise referral to general medical practitioners, gastroenterologists or infectious diseases specialists may be appropriate. The Australian Dental Association is able to provide referral details for dentists, oral medicine specialists and oral and maxillofacial surgeons.

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APPENDIX

Appendix 1: Information about needle-stick injury management.

In the event of a needle stick or other blood or body fluid exposure, immediate management of a needle-stick injury should be performed.⁵⁶ The HIV, HBV and HCV status of the source patient involved may be established after gaining informed consent. It should be noted, however, that the source patient could be in the window period and therefore their immediate blood results may be inconclusive. The recipient of the injury can choose to have Liver Function Tests (LFTs) and HCV RNA PCR testing four weeks after exposure, and antibody HCV testing at three and six months post-exposure. In order to establish a baseline measurement, it is recommended to have LFTs and a HCV antibody test on the day of the exposure or shortly thereafter. Currently there is no PEP for Hepatitis C.

An Occupational Exposure Protocol ensures that people know the specific steps to take if required (i.e. first aid, reporting, risk assessment and counselling). This also includes having access to the names and contact details of relevant professionals, such as GPs, Accident and Emergency departments and hepatitis C councils.

ASHM resources

Other ASHM resources, including the following hepatitis C related publications, are available from the ASHM website: www.ashm.org.au

Profession Based Booklets

- An Overview of Hepatitis C: Clinical management in opiate pharmacotherapy settings
- Correctional Officers and Hepatitis C
- General Practitioners and Hepatitis C
- Nurses and Hepatitis C
- Pharmacy and Hepatitis C

Factsheets

- GP Companion Resource to 12 Questions on Hepatitis C
- Hepatitis C in Brief – patient factsheet (Available online only in English and 8 community languages: Arabic, Chinese, Greek, Indonesian, Italian, Khmer, Spanish and Vietnamese)
- Hepatitis C Management and Treatment for Clients of Pharmacotherapy Services (Available online only)

Monographs

- 2011–2012 Directory of HIV, Viral Hepatitis & Sexual Health Services
- Co-infection HIV and Viral Hepatitis: a guide for clinical management
- Hepatitis C: clinical management in opiate pharmacotherapy settings
- HIV and Viral Hepatitis C: policy, discrimination, legal and ethical issues
- HIV, Viral Hepatitis and STIs: a guide for primary care

Manuals

- Australasian Contact Tracing Manual
Available in hardcopy and online at www.ashm.org.au/ctm

DVD

- C Me, Hear Me. Hepatitis C in our own words

Online Learning Modules

To access online education modules visit the Australasian Society for HIV Medicine (ASHM) website at www.ashm.org.au/e-learning

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Further information and contacts

Australia

Hepatitis Australia

Provides links to state and territory hepatitis organisations.
National Infoline 1300 437 222
Web: www.hepatitisaustralia.com

Australian Injecting and Illicit Drug Users League (AIVL)

Provides information and advocacy around injecting drug use.
Tel: 02 6279 1600
Web: www.aivl.org.au

Gastroenterological Society of Australia / Australian Liver Association

Tel: 1300 766 176
Email: gesa@gesa.org.au
Web: www.gesa.org.au

Australian Commission on Safety and Quality in Healthcare (ACSQHC)

ACSQHC have a number of programs, publications and resources to support healthcare professionals, healthcare organisations and healthcare policy makers, working with patients and carers, to deliver safe and quality healthcare across Australia.
Tel: 02 9126 3600
Fax: 02 9126 3613
Email: mail@safetyandquality.gov.au
Web: <http://www.safetyandquality.gov.au/>

National Health and Medical and Research Council

Australian guidelines for the Prevention and Control of Infection in Healthcare (available on line or PDF only)
Tel: 13 000 NHMRC (13 000 64672)
Email: nhmrc.publications@nhmrc.gov.au
Web: <http://www.nhmrc.gov.au/node/30290/>

Therapeutic Guidelines Ltd

Oral and Dental Expert Group. *Therapeutic guidelines: oral and dental. Version 2.*
Melbourne: Therapeutic Guidelines Limited; 2012.

The Australasian Society for Infectious Diseases (ASID) Inc

Tel: 02 9222 6204
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