

Introducing the FATLIPS acronym for assessing the red flag clinical features of dental infection

Zachary Cole-Healy,^{*1} Danny Adam,² Kowoon Noh³ and Richard M. Graham⁴

Key points

The FATLIPS acronym aids assessment of red flag features for serious and severe dentofacial infection.

The FATLIPS acronym is a simple *aide-mémoire* for use by dentists in primary care.

The FATLIPS acronym can aid communication between dentists in primary and secondary care.

Abstract

Introduction Dental infection can progress to life-threatening cervicofacial and deep space infections. Therefore, safe management requires early identification of serious infections in primary care with appropriate referral to secondary care. We have developed an acronym to aid assessment of the red flag clinical features for serious dental infection in primary care by general dental practitioners.

Materials and methods Literature review and focus group discussions.

Results We introduce the FATLIPS acronym for assessment of red flag features of dental infection: failed previous treatment(s), airway compromise, trismus, look (lower border mandible, orbit, oral, neck), immunosuppression, pyrexia, swallowing difficulties.

Conclusion We propose the FATLIPS red flags acronym to help dentists assess the red flag features of dental infections in primary care.

Introduction

It is paramount that patients with serious dental infections are referred appropriately to secondary care.¹ There is growing evidence of an increasing rate of severe dental infection requiring treatment in secondary care.^{2,3} Features of severe odontogenic infection are well established in the literature.^{4,5,6,7,8} We propose a memorable and comprehensive acronym to aid in the assessment and appropriate referral to secondary care of patients with serious odontogenic infections by general dental practitioners (GDPs).

¹ST1 in Oral and Maxillofacial Surgery, North Manchester General Hospital, Manchester, UK; ²ST3 in Oral and Maxillofacial Surgery, North Manchester General Hospital, Manchester, UK; ³DCT1 in Oral and Maxillofacial Surgery, North Manchester General Hospital, Manchester, UK; ⁴Consultant in Oral and Maxillofacial Surgery, North Manchester General Hospital, Manchester, UK.
*Correspondence to: Zachary Cole-Healy
Email address: zachary.cole-healy@nhs.net

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Aim

To develop a memorable acronym so as to improve GDP knowledge and awareness regarding the assessment of the red flag features of dental infection in primary care.

Materials and methods

A focus group was formed which included the following opinion levels: oral and maxillofacial surgery (OMFS) consultant, OMFS speciality registrar (StR) and OMFS dental core trainee (DCT). Those in this group are the authors of this paper. This group met on three occasions. The sessions were moderated by the senior member of the team. The discussions were recorded in meeting minutes.

A literature review was conducted using the PubMed database. Non-English language papers were excluded. Initially, the abstracts of papers identified from the search terms were reviewed. Reviews of full texts were performed for the relevant papers. Search terms included: red flags of/for dental infection (two papers, zero full papers reviewed), clinical features of

severe dental infection (172 papers, five full papers reviewed) and symptoms of severe dental infection (1,958 papers, 28 full papers reviewed).

Red flag features identified from the literature review were listed and reviewed by the focus group. Red flag features that require investigations unlikely to be available in primary care were excluded. Each red flag feature was then simplified to a commonly accepted word or phrase. Synonyms of these words were sought to give a wider base of letters for use in an acronym. Synonyms were only considered if widely accepted to be equivalent in meaning. Using the list of red flags and synonyms, different acronyms were explored.

Results

The FATLIPS acronym was devised and is shown in Table 1. The table highlights each point with relevant findings and what positive findings should make the assessor 'think'. All letters in the FATLIPS algorithm represent one red flag feature, other than the letter L. The

Table 1 The FATLIPS red flags acronym (bpm = beats per minute)

Letter	Sign/symptom	Findings	Think
F	Failed treatment(s)	Recent treatment (eg local measures +/- antibiotics) Concerning rapid progression and short duration of symptoms	May not respond to further antibiotics Virulent organism
A	Airway	Shortness of breath (ie struggling to complete sentences and noises) Choking feeling	Suggests airway compromise
T	Trismus	Mouth opening (assessment in centimetres) Mild = <3 cm, moderate = <2 cm or severe = <1 cm ^{4,8}	Submasseteric +/- pterygomandibular space infection Note that pain may cause limitation – not due to a true collection or abscess
L	LOOK at skin colour and feel for swelling of:	L: Lower border of mandible not palpable	Submandibular space infection
		O: Orbit	Periorbital swelling and discomfort May suggest orbital cellulitis or abscess
		O: Oral cavity	Raised floor or mouth/limited tongue protrusion Sublingual abscess Deviated uvula Peritonsillar +/- medial pterygoid +/- parapharyngeal space infection
		K: neck	Painful neck movements Neck swellings Both suggest deep neck space infection
I	Immunocompromised status and other co-morbidities	Chemotherapy/steroids Medical history (eg poorly controlled diabetic) Alcoholic, smoker Current pregnancy	Reduced ability to fight infection
P	Pyrexia/sepsis and other parameters	Temperature >38 °C/<36 °C Heart rate >90 bpm Respiratory rate >20 bpm Blood pressure <90 mmHg systolic	Signs of sepsis ^{9,10} Suggests significant systemic response
S	Swallowing difficulties	True swallowing difficulty Drooling	Swelling/infection adjacent to oropharynx

letter L represents the word 'LOOK'. LOOK is a secondary acronym which highlights important features to 'look out for' on examination, as outlined in Table 1.

Discussion

Mnemonics, acronyms and algorithms are ubiquitous in medicine¹¹ and can have great utility; for example, we have recently found the 'CORONA' acronym to assist with tracheostomies during the COVID-19 pandemic extremely useful.¹² Indeed, similar checklists have been a key driver for improving surgical patient safety in recent times.¹³ To our knowledge, no mnemonics or acronyms have been devised to aid with the assessment of patients with dental infection.

The typical 'walk-in' patient with dentoalveolar infection can present with an array of signs and symptoms.^{1,5,14} These signs and symptoms may be signifiers, or red flags, of a potentially life-threatening infection. The

dentist is therefore faced with a dilemma of whether to manage infections in primary care or refer the patient to their local emergency/OMFS department for further management. The FATLIPS acronym presents previously established red flag features of dental infection in a simple and memorable format. It will aid the GDP in identifying patients who require referral to secondary care and how rapidly.

The red flag symptoms and signs incorporated in the FATLIPS acronym are well established in contemporary texts and in the published literature.^{4,5,6,7,8} Bridgeman *et al.*⁶ have previously suggested that the following factors should prompt referral to secondary care in the context of dental infection: infection not amenable to treatment under local anaesthetic, trismus, severe medical comorbidities, systemic upset, multi-space infection or requirement for extraoral drainage.⁶ Moreover, in a literature review by Robertson *et al.*,⁷ the following factors were also suggested as red flags for severe dental infection: signs of sepsis, trismus,

raised tongue and floor of mouth or drooling, periorbital swelling, difficulty with speaking or swallowing, increased white blood cell count and lymphadenopathy.⁷ Furthermore, a scoring system has been suggested by Sainuddin *et al.*⁸ to assess the severity of dental infection; factors incorporated into this score are graded and include systemic inflammatory response syndrome, trismus, dysphagia, number of spaces involved, dehydration and comorbidities.⁸ The FATLIPS acronym incorporates the factors outlined by Bridgeman, Robertson and Sainuddin and the wider literature in a memorable format aimed primarily at GDPs.

The FATLIPS acronym is primarily for use by GDPs in primary care. Certain established red flags were excluded from the FATLIPS acronym as they require tests not readily available to the GDP; for example, blood test results and imaging results. The FATLIPS acronym is therefore not comprehensive when used in secondary care. However, despite this limitation, we believe that the FATLIPS

acronym can be a useful tool/framework in both primary and secondary care.

To add current context, the FATLIPS acronym has been of particular use and value during the COVID-19 pandemic, where face-to-face consultations have been limited, with a subsequent increase in telephone consultations.^{15,16} It has recently been suggested that any telephone dental consultations must include a risk factor assessment and screening for sepsis.¹⁰ We believe that the FATLIPS acronym fulfils the requirements of such a risk factor assessment tool. Furthermore, FATLIPS will complement the 'Index of dental facial infection' pictorial guide published by Birmingham Dental Hospital to aid communication between the patient and the dentist during telephone consultations.¹⁷ Indeed, FATLIPS, includes all of the factors considered in this index; that is, trismus, pyrexia, immunosuppression and pertinent examination findings.¹⁷ Moreover, FATLIPS incorporates swallowing difficulties, airway compromise and failed previous dental treatment(s), which potentially increases the likelihood of identifying severe dental infections through the use of this acronym. In addition, FATLIPS may reduce the risk of COVID-19 transmission in the dental infection patient population by reducing unnecessary referrals to hospitals.

Despite its contemporary relevance, we believe that the FATLIPS acronym will have excellent utility post-COVID-19 pandemic during more normalised dental and surgical practising times. Indeed, the relevance and applicability of FATLIPS is emphasised by the

increasing incidence of severe dental infection in recent times.^{2,3}

Conclusion

Overall, we recommend widespread use of the FATLIPS acronym for the swift, efficient and reproducible identification of red flag features for serious and severe dental infection. The value of the FATLIPS acronym is in structuring the red flag features of severe dental infection in a simple and memorable format for the GDP. This format allows for easier and more efficient communication. Therefore, the FATLIPS acronym can improve patient safety by standardising the work-up and referral of patients with severe dental infection in primary care to secondary care.

Conflict of interest

None of the authors have any competing interests to declare in relation to the contents of this publication.

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