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Saturday, August 10, 2019

(Room 2)

16:30 - 17:30 WS #132: Oral Hints of Systemic Disease

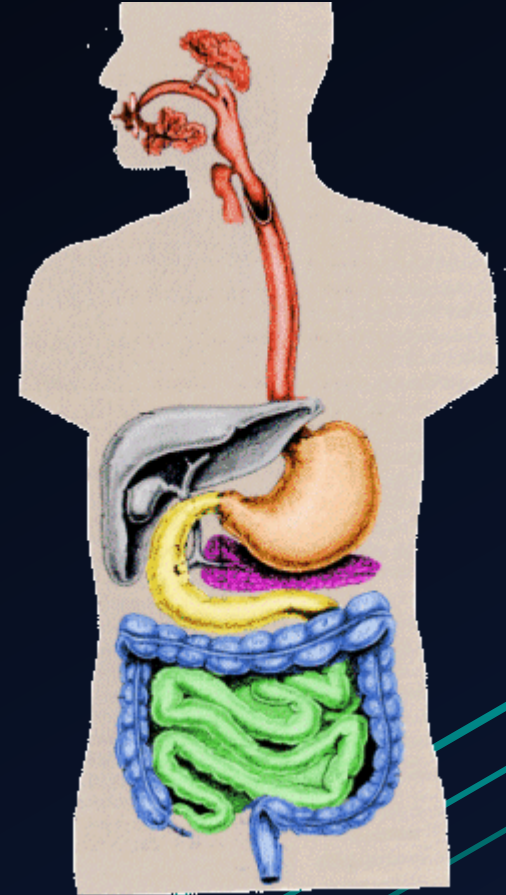
17:35 - 18:30 WS #142: Oral Hints of Systemic Disease (Repeated)

ORAL HINTS OF SYSTEMIC DISEASE

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“The journey starts here”



Oral Hints of Systemic Disease

- Richter's transformation of CLL
- Nutrition
- Gastrointestinal, hypersensitivity – Crohn's, OFG
- Vesiculobullous
- Dry mouth – a sign of many diseases & complications
- Facial Pain – systemic disease or stress anxiety

Oral Cavity

- The mouth mirrors many systemic diseases, so it can be useful diagnostically and prognostically.
- Failure to consider the oral cavity may sometimes lead to further morbidity
- The mouth is frequently forgotten in medical treatment plans



Presenting complaint of sore gums and weight loss...only disease was ABC!



Background history

- Chronic lymphoid leukaemia (CLL)
- Patient had had scans & endoscopy looking for malignancy “somewhere”
- Diffuse large B cell lymphoma diagnosed in gingivae (gums)
- Rapid and remarkable recovery of systemic signs and gingival condition with chemotherapy



Richter Syndrome

- Transformation of CLL into diffuse large B cell lymphoma
- Unusual in mouth, but possible

Oral Manifestations of systemic disease

- Nutritional deficiencies
- Blood dyscrasias
- Gastrointestinal disease – Crohn's disease, coeliac disease, PBC
- Skin disorders – lichen planus, vesiculobullous disorders
- Autoimmune disease – pemphigus, Sjogren's syndrome, pernicious anaemia
- Oral manifestations of stress, somatisation
- Infectious diseases – HIV, syphilis
- Sarcoidosis
- Facial Pain



Nutritional deficiencies





Causes of Folic acid deficiency

- Malabsorption
- Alcoholism
- The elderly (tea & toast diet)
- Increasing demands (pregnancy)
- Drugs (phenytoin, azathioprine, methotrexate)

Oral Manifestations of Folate Deficiency

- Oral ulceration
- Burning mouth syndrome
- Dysplastic and malignant changes
- May be a co-factor in the aetiology of candidosis

Iron Deficiency epithelial changes

- Atrophy of epithelium
- Decrease in cytoplasmic diameter
- Enlarged / double nuclei
- Decrease in cell size

Oral manifestations of Iron and serum B12 deficiency

- Oral ulceration
- Oral candidosis to include angular cheilitis
- Burning mouth syndrome
- Taste abnormalities
- Dysplasia & malignancy
- Atrophic tongue & Glossitis



Patients with oral ulcers, cracks at corners of mouth, sensitive or burning mouths, check:

- Full blood count
- Iron studies
- Serum B12 & folate
- Frequently improves the mouth symptoms, may indicate an underlying problem



Oral manifestations of gastrointestinal disorders



History of lady with Crohn's disease

- First developed troublesome mouth ulcers when 13 years old
- Developed intestinal symptoms when 16 years old
- Noted that oral problems preceded a flare-up of intestinal problems
- Some years ago started to develop swollen lip, particularly on left side and redness and induration of mainly left maxillary region





Orofacial granulomatosis (OFG)
or, perhaps,
Oral Crohn's disease (OCD)

Orofacial Granulomatosis

- First described as Cheilitis Granulomatosa in 1945 by Miescher
- Names include Melkersson-Rosenthal Syndrome, Cheilitis Granulomatosa
- Characteristic orofacial signs that occur both independently and in conjunction with systemic disease, usually Crohn's Disease(CD)

OFG / OCD

- All ages, although often children
- Appearance concerns and history of bullying, called names
- “Odd” presentation...? Swollen face or splitting lips
- An intra-oral “polyp” or lump (tag)
- Ulcers
- Cracks at corners of mouth
- Swollen cheeks

Challenges of OFG / OCD

- A proportion of OFG patients have significant appearance related concerns (Escudier 2001).
- Patients frequently report that they get a negative response from peers as a result of their OFG

Clinical Features

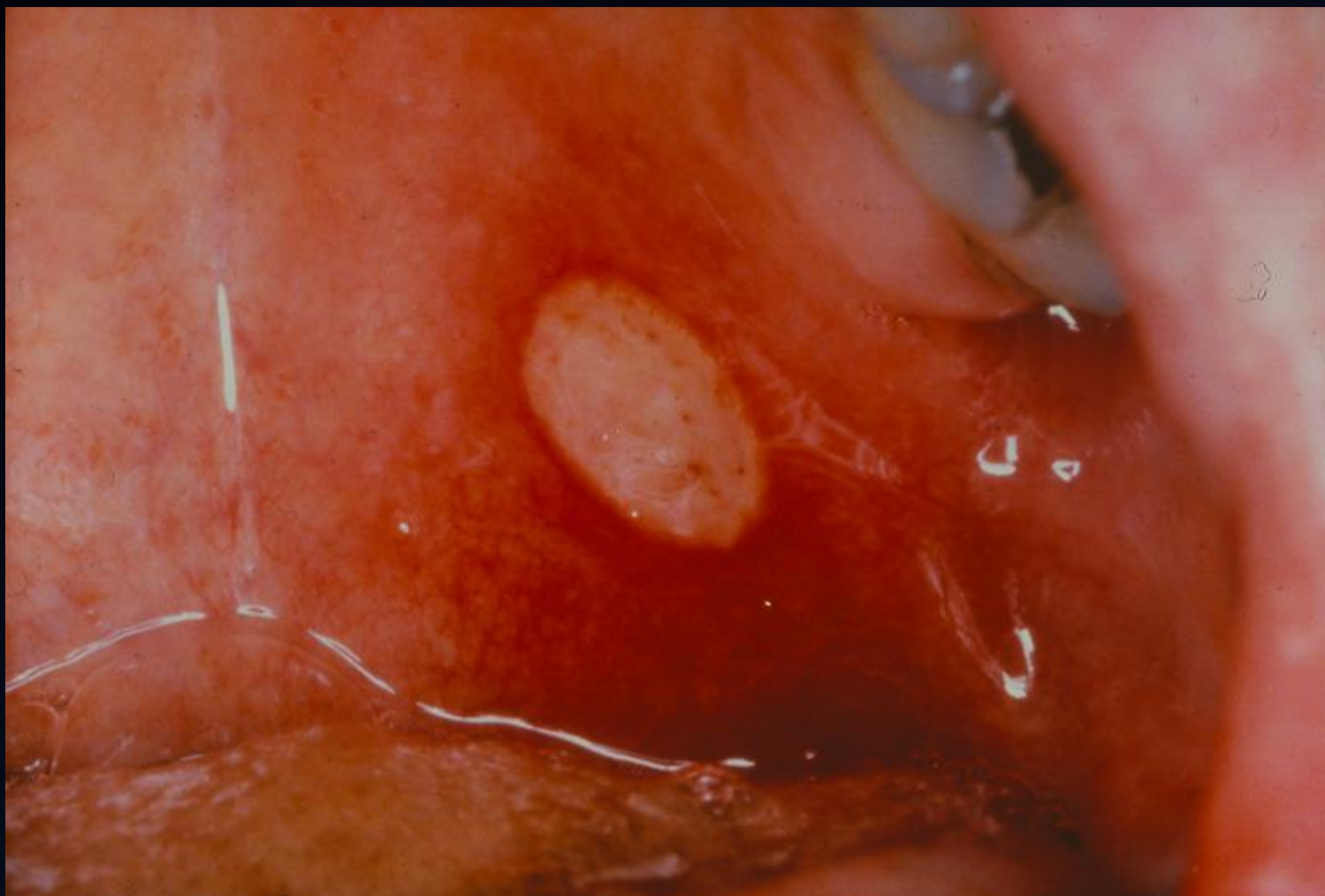
- Lip / facial swelling
- Oral ulceration
- Pyostomatitis vegetans
- Cobblestone mucosa
- Mucosal tags
- Angular cheilitis
- “Full-width” gingivitis.
- *Staghorn appearance*











Angular Cheilitis









Possible underlying causes of this presentation

- Hypersensitivity reaction, food allergies
- Crohn's disease
- Other granulomatous disorders (sarcoidosis)
- The OFG / OCD presentation may precede intestinal Crohn's disease by about 10 years

The association between Oral Crohn's & OFG?

- Weisenfeld (1985) reported Crohn's in 10% OFG patients
- Scully reported 37% OFG had CD '82
- Williams (1991) reported an incidence of 48%
- Williams (1991) reported 9/14 subsequently developed CD
- Ghandour & Issa(1991) described oral Crohn's predating CD by 9 years
- Plauth (1991) stated oral signs predated CD 60% cases

Sanderson 2005

- 35 patients with OFG, but no gut symptoms & 35 controls had ileocolonoscopy & biopsy to see if co-existent bowel disease occurred.
- Concluded that OFG associated bowel disease might represent a separate entity other than CD
- Suggested these OFG with no bowel S & S had granulomatous inflammation of GI secondary to unknown antigens
- 1% CD patients have OFG (White 2011)

Children with Crohn's disease – oral signs

- Aphthous ulceration is a commonly recognised sign...least specific sign
- Study of 25 children demonstrated 48% had disease specific signs of Oral Crohn's disease (OCD) (Harty 2005)
- 10/20 children with OCD-CD had peri-anal disease
- Compared with children who had CD alone, they suffered a severe disease burden in the 5 year follow up period

Hussey 2007

ORAL lesions in children with Crohn's disease

- Oral signs as an initial sign as opposed to a “follow up” sign was significant
- Association was with peri-anal disease

Campbell et al (2011)

- Reported the risk of progression from oral signs to CD in adults in a large series of cases of OFG was 20% over a median follow up of 5 years
- This percentage accords with the earlier report by *Field et al* (1989) on the 10 year follow-up of small cohort of OFG patients where one of five OFG patients developed CD.

Oral features associated with a diagnosis of CD

The Campbell series (2011) demonstrated that certain oral features predicted future CD

- Intraoral ulceration (often sulcal)
- Abnormal haematological and inflammatory blood parameters



Oral aspects of Crohn's Disease

- Sanchez (2005) also reported oral ulceration re-appearing as patients develop antibodies to monoclonals
- Oral problems tend to resolve with good control of intestinal disease
- Therefore oral signs appear to reflect intestinal disease activity of Crohn's Disease

History of Presenting Complaint

R has recently had surgery for a **perianal fissure** just three days before we met. There was faint **angular cheilitis** on the right side of mouth. There is some **family history** of inflammatory bowel disease. She is quite **atopic** and suffers itchiness of the lower lip but she has never had **lip** swelling. She reports “bumpiness” (in keeping with **cobblestone mucosa**) on the inside of cheek. R reported **oral ulcers**, which on questioning, are usually **linear** and occur in the lower buccal **sulci**. She has **asthma and eczema** and she develops hives with tomatoes. She generally does not drink **fizzy drinks**, although recently she has started to do so when she is socialising. The onset of facial swelling also occurred around this time. This suggests atopy, with a possible intolerance to benzoic acid, which is common in Orofacial Granulomatosis. R is of relatively **low stature**. Although she is the smallest in her class, this may be familial. Otherwise, she is well.

Hypersensitivity

- Food sensitivity in 20% of OFG patients...other triggers
- Evidence of Type 1 and Type IV hypersensitivity in these patients
- Type 1 is supported by raised IgE in blood and subepithelial B cells that express IgE
- Type IV is tested by patch testing, but Campbell (2011) showed that 40% of patch test negative patients still responded to dietary elimination

“Allergy” & OFG

- Most common allergens identified are Benzoates (E210-219), Cinnamonaldehyde and chocolate
- Involves absolute avoidance for months...? Re-challenge after 1 year if patient wishes



The Assessment

- Clinical features
- Frequency & duration of clinical features
- GI history
- Family history
- Association with foods, environmental factors, history of atopy

Investigations of OFG

- FBC, B12, Red cell folate, Ferritin, LFTs, CRP, faecal calprotectin
- SACE
- (C3, C4, IgE, C1 esterase level & function)
- Patch testing (type 4 hypersensitivity)
- Oral mucosal biopsy
- GIT investigations (?Crohn's)

The results of initial investigations

- Biopsy: Confirm histological diagnosis of OFG, time to reflect
- Are there nutritional deficiencies...often iron, maybe B12?
- Inflammatory markers
- Sometimes there is little other than a positive biopsy

Management of OFG / Oral Crohn's disease

- Difficult
- Surgery
- Elimination diets
- Intra-lesional steroids / topical steroids
- Systemic Steroids (Good for ulcers, not swelling)
- Clofazamine 100mg 4 times daily for 3-11 months
- Thalidomide
- Topical Tacrolimus
- Anti-TNF treatment

Oral Crohn's disease

- Oral manifestations may be the first sign
- Actively investigate for Crohn's disease at the outset
- Hypersensitivity may co-exist or for some it may be an OFG- only clinical picture, where dietary avoidance is very successful (See Guy's Hospital OFG Benzoic acid and Cinamonaldehyde free diet)

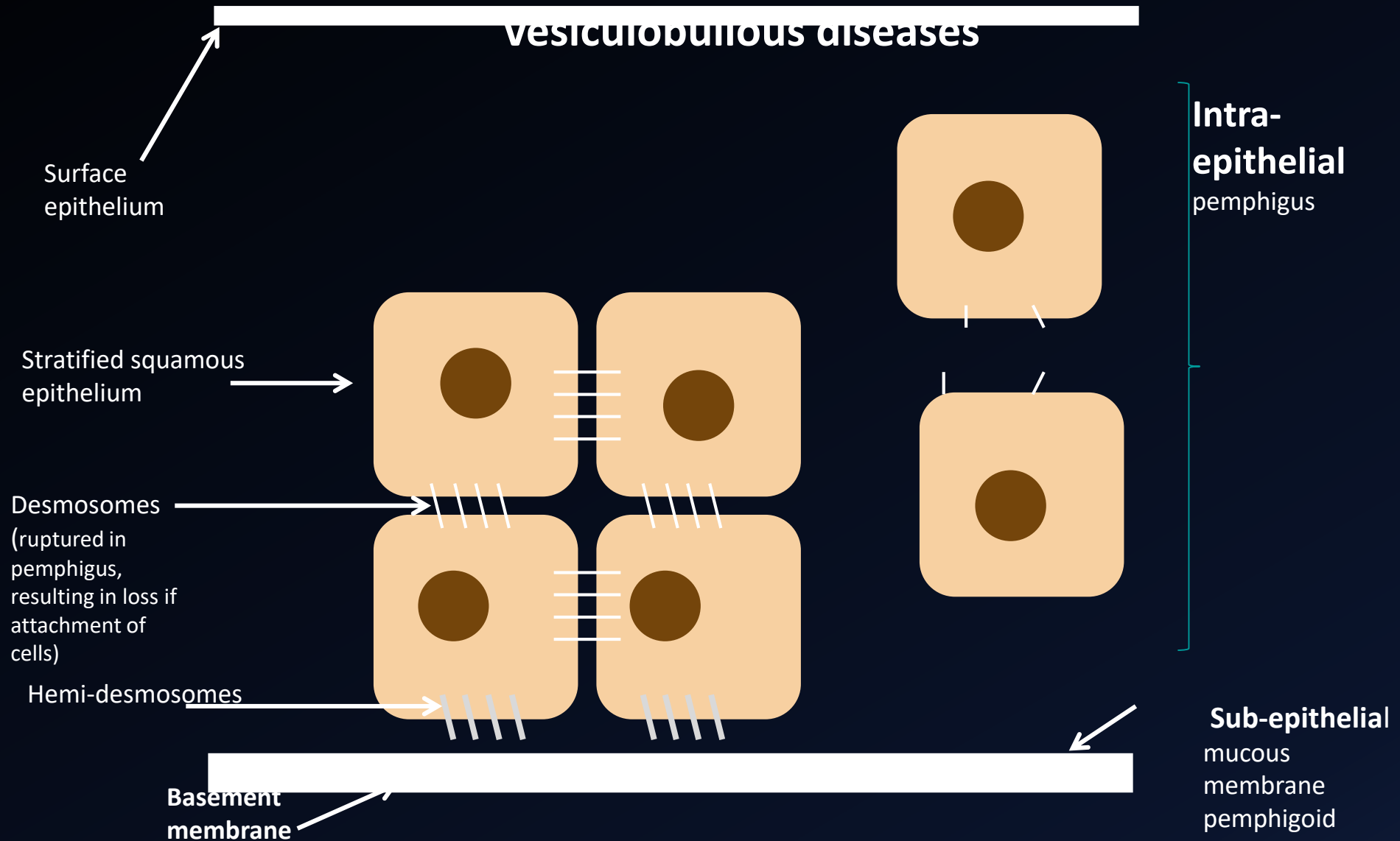
Skin disorders – oral manifestations

- Pemphigus
- Pemphigoid (Mucous membrane pemphigoid, Linear IgA disease)
- Epidermolysis bullosa acquisita
- Other autoimmune skin diseases with oral manifestations
- Lichen Planus
- Erythema Multiforme
- Lupus Erythematosus



Splits in the mucosa of vesiculobullous diseases

Splits in the **mucosa of** **vesiculobullous diseases**



Clinical phenotypes of autoimmune blistering disorders

- Manifest in oral mucosa as erythema, blisters, erosions or ulcers
- Oral blisters and ulcers are the most common presentation
- Blisters burst, leaving irregular ulcers that result in pain, particularly when speaking, eating and swallowing
- Extra-oral examination (or history) may reveal lesions on the skin or other mucous membranes such as nose, eyes or genitalia
- Many manifest desquamative gingivitis



Pemphigus

A chronic autoimmune disorder characterised by epithelial blisters affecting the skin and mucous membranes

Why may the mouth be involved and not the skin?

- Oral epithelium expresses mainly desmoglein 3, but skin expresses desmoglein 1 & 3
- Therefore antibodies to desmoglein 3 results in oral lesions whilst skin integrity is maintained by Dsg1

Pemphigus vulgaris

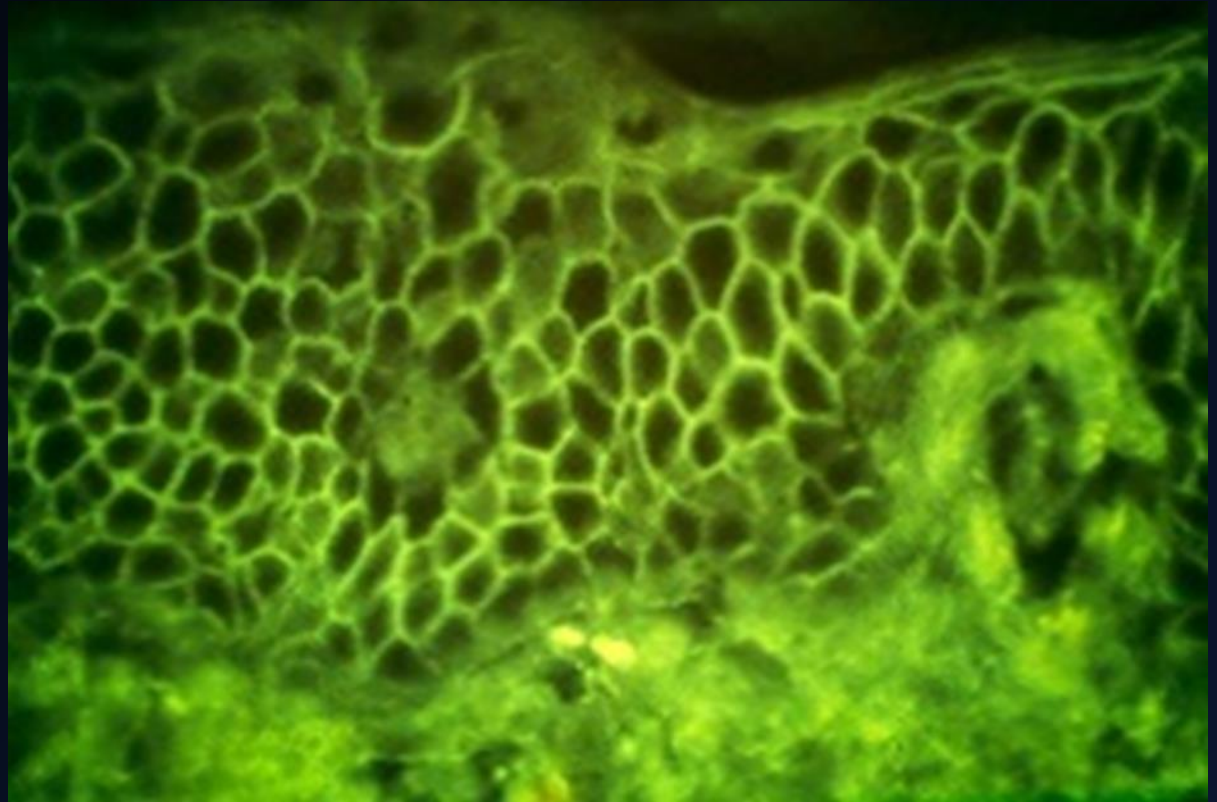
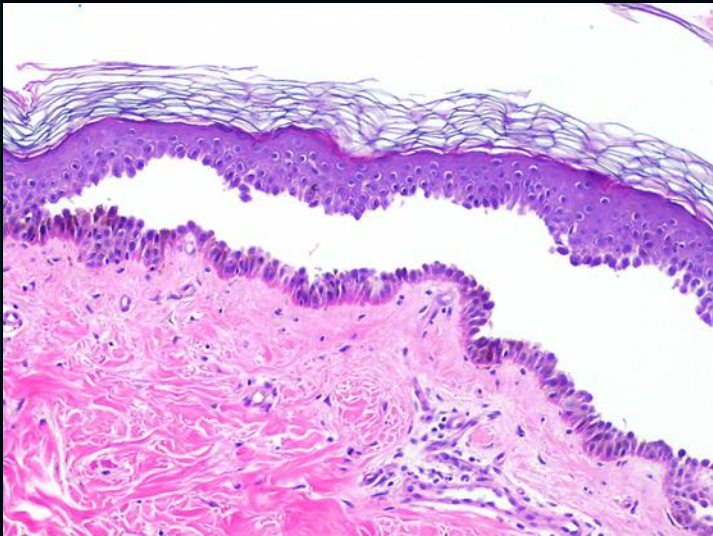
- Before corticosteroid therapy, mortality was 90% and still has 2.36 fold increase in mortality compared with general population (*Huang Y-H 2012*)
- The clinical features correlate well with the ant-desmoglein profile in the patient's serum
- The initiating stimulus for the production of pemphigus autoantibodies remains unclear, but predisposing factors such as genetic associations and drugs such as ACE inhibitors (cilazopril) , diet, stress have been implicated (*Ruocco V 2013*)

Pemphigus – extra-oral manifestations

- Oral lesions persist for many months before progressing to skin or other sites
- Skin lesions tend to occur on trunk, groin, axillae, scalp, face and pressure points
- Blisters coalesce, rupture and result in painful erosions *(Venugopal SS 2012)*
- 87% have ear, nose and throat involvement *(Kavala M 2011)*
- Eye is less common, transient, look like conjunctivitis



Diagnosis (histopathology & direct immunofluoresence)



Management

- High dose systemic steroids (60-100mg initially...steroid card & careful monitoring. Reduce the number of circulating T-lymphocytes and diminish their response to antigen
- Maintenance dose for life +/- azathioprine as “steroid sparing drug” i.e. enhances steroid effect at lower dose, mycophenolate mofetil, cyclophosphamide (IV pulse therapy), calcineurin inhibitors
- Supportive care (chronic disease, information)

Not all patients are “textbook”
32 year old pregnant lady





Neonatal pemphigus

- Neonatal pemphigus is a rarely reported transitory autoimmune blistering disease
- Clinically characterized by transient flaccid blisters and erosions on the skin and rarely on the mucous membranes
- The disease can be self-healing at 2-3 weeks without special treatment, and does not have long-term clinical significance.
- Neonatal pemphigus is mainly due to the transplacental transmission of antibodies

Paraneoplastic pemphigus

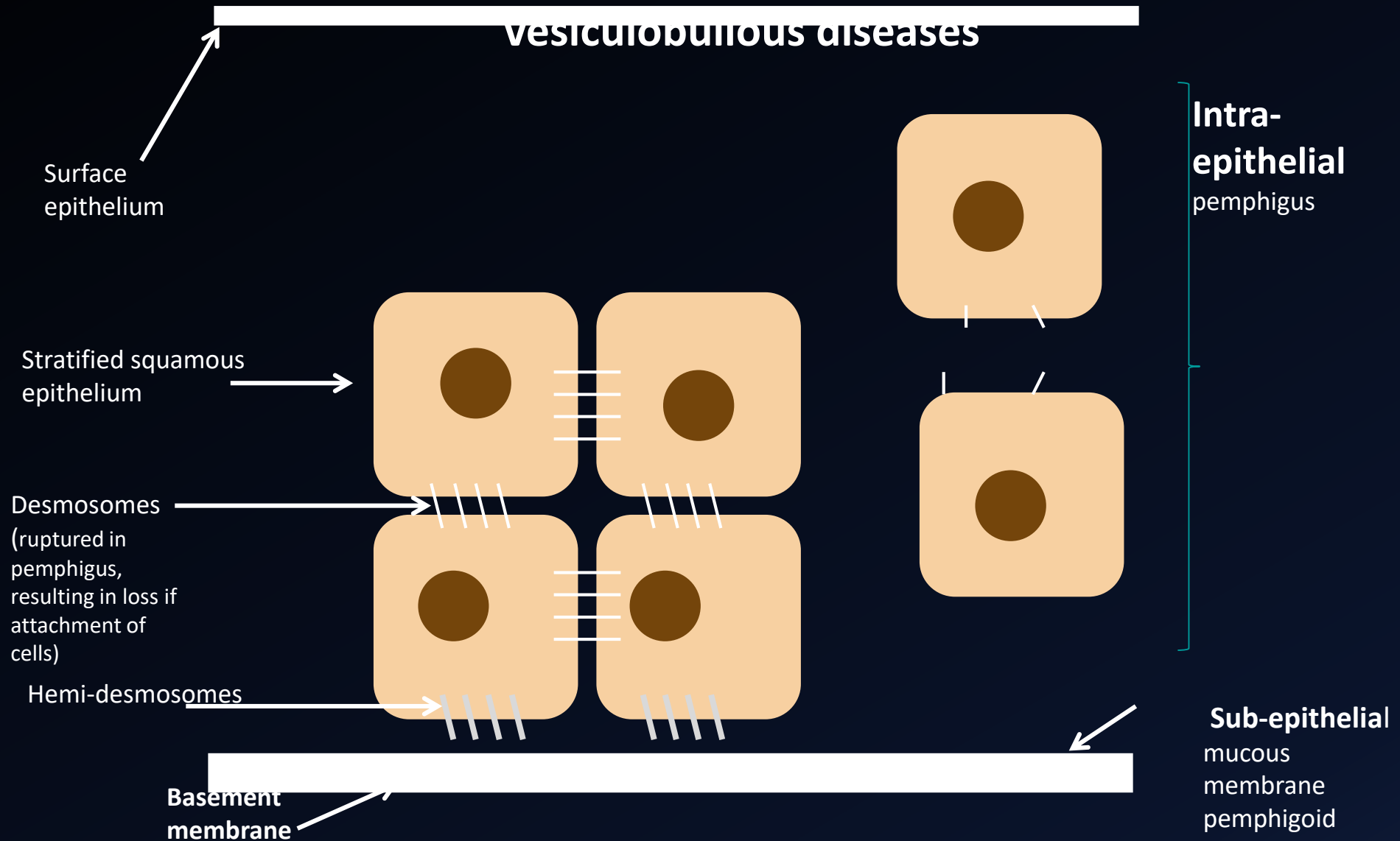
- Also termed paraneoplastic multi-organ syndrome (PAMS)
- Associated with malignant tumours such as lymphomas, leukaemia or malignant lymphoma
- Disease arises as a result of several autoantibodies against several keratinocyte proteins and patients develop intractable oropharyngeal mucosal ulceration and crusting of lips as well as typical cutaneous eruptions
- Least common and most serious form of pemphigus first described in 1990

Pemphigoid

- A family of chronic sub-epithelial blistering disorders
- Can affect the oral, nasal and conjunctival mucous membranes
- F>M
- Bullous & Mucous membrane pemphigoid
- Genetic predisposition but may be drug induced

Splits in the mucosa of vesiculobullous diseases

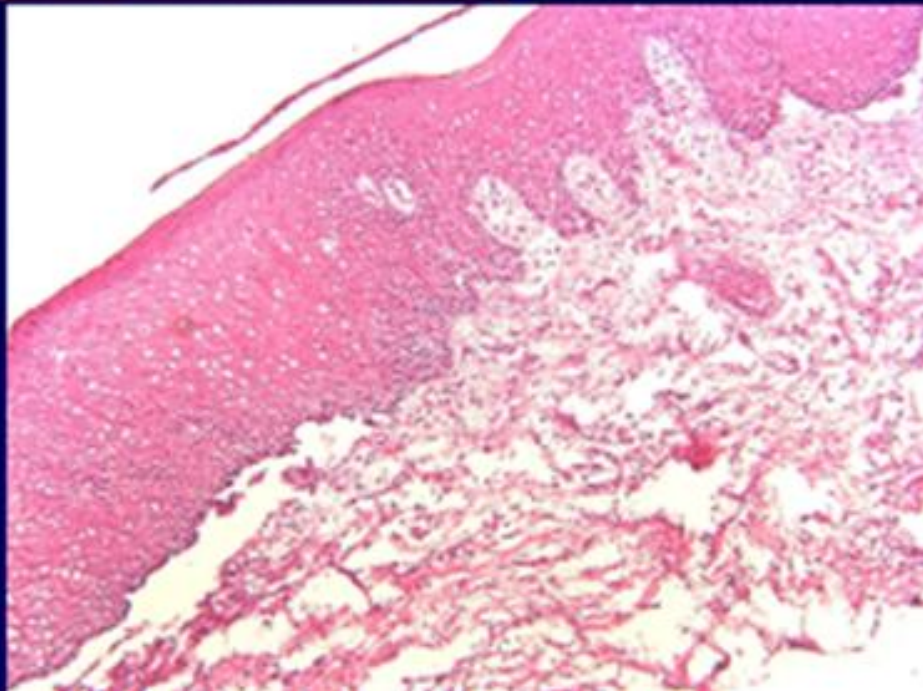
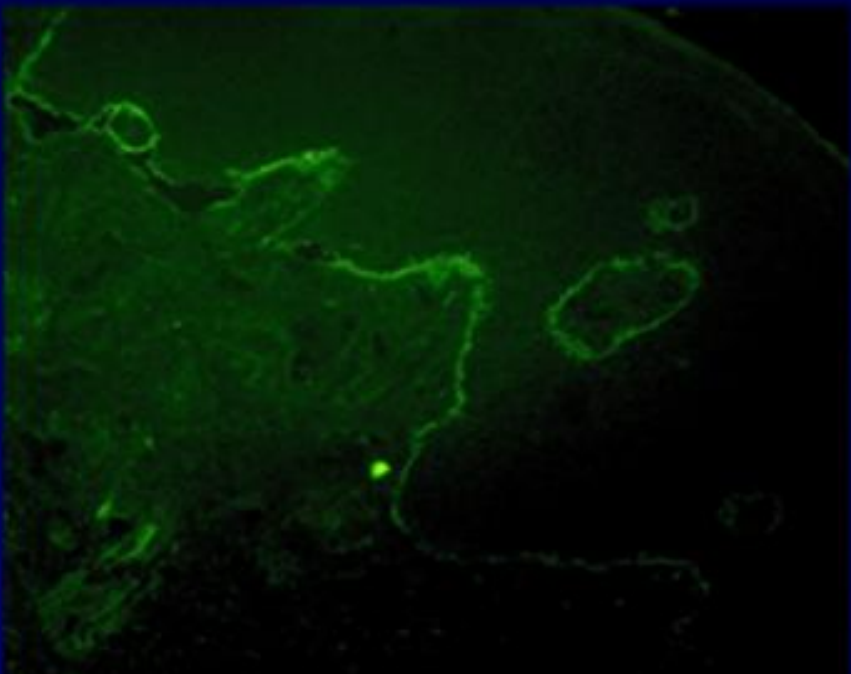
Splits in the mucosa of vesiculobullous diseases



Immunological characteristics

- Deposition of immunoglobulins and complement components at BMZ
- Circulating autoantibodies





Management

- Usually topical steroids
- Sometimes systemic treatment

Dry Mouth



Xerostomia & Salivary hypofunction

- **Common (?)**
- Frequently undiagnosed, and, therefore, untreated
- Barriers to diagnosis and treatment due to:
 - (a) Diverse symptomatology and presentations
 - (b) Lack of awareness of the condition and its management by health professionals
 - (c) A perception that the condition is mild and that therapy is either not available or not necessary

Dry mouth

- Drugs
- Irradiation
- Dehydration - diuretics
- Psychogenic

Underlying diseases that may manifest as dry mouth

- Salivary gland disease
- Sjogren's syndrome and other autoimmune diseases, hepatitis C, primary biliary cirrhosis, sarcoidosis, HIV, amyloidosis

Other Systemic diseases presenting with a dry mouth

- Auto-immune, rheumatological
- Endocrine (diabetes mellitus, hypothyroidism)
- Neurological (Parkinson's)
- Genetic disorders (Down's syndrome, agenesis of salivary glands, hereditary haemochromatosis)
- Metabolic disorders (renal, anorexia, bulimia, alcohol abuse)
- Infectious disease (HCV, HIV)
- Others (sarcoidosis, chronic pancreatitis)

Drugs and a dry mouth



Drugs & dry mouth

- Direct damage to salivary glands...cytotoxic drug
- Drugs with anti-cholinergic effect e.g. Tricyclic antidepressants, Proton pump inhibitors, antihistamines, hyoscine
- Drugs which have a sympathomimetic effect e.g. Beta blockers – atenolol, Alpha 2 agonists - clonidine
- Drugs that deplete fluid e.g. diuretics



Subjective & objective aspects of a dry mouth

- **Salivary gland hypofunction** occurs when salivary gland output is lower than normal (a sign)
- **Xerostomia** is the subjective feeling of dry mouth (a symptom)
- Empirical evidence that the two are not concurrent. Thomson(1999) reported that 20% of older South Australians had either one or the other, but the two concurred in only 1/6 of those with either symptom



POPULATION



People are living longer. One in four people in Europe and North America will be over the age of 60 by 2030.

UNECE helps countries prepare and monitor strategies to adapt to demographic change and to realize the potential of living longer. The aim is a society for all ages that leaves no one behind.

UNECE efforts on population directly contribute to achieving SDGs 1, 3, 5, 8, 10 & 11.



Aging

- Tylanda (1988) reported 30% **acinar loss** with age (replaced by adipose & fibrous tissue)
- Ghezzi (2003) reported that the elderly are more susceptible to the effects of ant-cholinergic **drugs**
- Smith (2013) detected **lower salivary flow rates** in those over 70 years, compared with controls
- Locher (1993) suggested that the salivary flow of the aged is related to numbers of **drugs** taken than influence salivary flow

Measuring the dry mouth

The journey to diagnosis (Ngo 2014)

- Symptom interpretation by patients - worried re cause being serious, impact on income or may attribute dryness to age or exercise
- Symptom interpretation by health care practitioners – depends on familiarity of practitioner with dry mouth and related problems
- Study showed mean waiting time was 7 years, one patient got diagnosis after 28 years

Flow Rates of Whole Saliva

Whole Saliva Flow Rates (ml/min)

	Normal Flow Rates	Abnormal Flow Rates
Unstimulated (Resting) Whole Saliva*	0.3 - 0.4 ml/min	< 0.1 ml/min
Stimulated Whole Saliva*	1 - 2 ml/min	< 0.5 ml/min

The Xerostomia Inventory (XI)

- A multi-item, 5-item, continuous scale instrument
- Tested and validated using samples from Australia, The Netherlands, Japan, and New Zealand
- The conclusion of that work was that the shortened XI (SXI) is valid for measuring xerostomia symptoms in clinical and epidemiological research

Original version

I sip liquids to aid swallowing food

My mouth feels dry when eating a meal

I get up at night to drink

My mouth feels dry

I have difficulty in eating dry foods

I suck sweets or cough lollies to relive dry mouth

I have difficulties swallowing certain foods

The skin of my face feels dry

My eyes feel dry

My eyes feel dry

My lips feel dry

The inside of my nose feels dry

Short-form version

My mouth feels dry when eating a meal

My mouth feels dry

I have difficulty in eating dry foods

I have difficulties in swallowing certain foods

My lips feel dry

The Challacombe Scale

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**DOWNLOAD THE NEW CHALLACOMBE SCALE
PATIENT REVIEW FORM NOW!**

The Challacombe Scale was developed from research conducted at King's College London Dental Institute under the supervision of Professor Stephen Challacombe.

It is a Clinical Oral Dryness Score (CODS) and uses a simple numeric system which enables the clinician to quantify the severity of the xerostomia and to decide if the condition needs treatment or not.

The scale is being targeted at all medical professionals who may have to diagnose xerostomia. This will include all members of the Dental Team, GPs and Practice Nurses, all care assistants and many more.

A.S Pharma have produced the scale as an easy to use poster which is perfect for hanging on clinic walls. Practitioners can get copies of the Challacombe Scale by contacting us by telephone, fax or email or they can order via our website.

"It is important in medicine to be able to make a decision that someone doesn't need treatment, which actually requires a greater depth of knowledge than the decision to treat – it is not the easy option. Having a recognised scale means patients can be monitored over a period of time for the effectiveness of treatment measures or for the need for subsequent treatment."

- Professor Stephen Challacombe



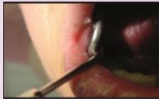
The Challacombe Scale

of Clinical Oral Dryness

KING'S
College
LONDON

The Challacombe Scale was developed from research conducted at King's College London Dental Institute under the supervision of Professor Stephen Challacombe*. The purpose of this scale is to be able to visually identify and quantify whether your patient has xerostomia (dry mouth) and if so, how it changes over time and the most appropriate therapy options. This scale is applicable whatever your profession.

The Challacombe Scale works as an additive score of 1 to 10 : 1 being the least and 10 being the most severe. Each feature scores 1 and symptoms will not necessarily progress in the order shown, but summated scores indicate likely patient needs. Score changes over time can be used to monitor symptom progression or regression.

1		Mirror sticks to buccal mucosa	An additive score of 1 - 3 indicates mild dryness. May not need treatment or management. Sugar-free chewing gum for 15 mins, twice daily and attention to hydration is needed. Many drugs will cause mild dryness. Routine checkup monitoring required.
2		Mirror sticks to tongue	
3		Saliva frothy	
4		No saliva pooling in floor of mouth	An additive score of 4 - 6 indicates moderate dryness. Sugar-free chewing gum or simple sialogogues may be required. Needs to be investigated further if reasons for dryness are not clear. Saliva substitutes and topical fluoride may be helpful. Monitor at regular intervals especially for early decay and symptom change.
5		Tongue shows generalised shortened papillae (mild depapillation)	
6		Altered gingival architecture (ie. smooth)	
7		Glassy appearance of oral mucosa, especially palate	An additive score of 7 - 10 indicates severe dryness. Saliva substitutes and topical fluoride usually needed. Cause of hyposalivation needs to be ascertained and Sjögrens Syndrome excluded. Refer for investigation and diagnosis. Patients then need to be monitored for changing symptoms and signs, with possible further specialist input if worsening.
8		Tongue lobulated / fissured	
9		Cervical caries (more than two teeth)	
10		Debris on palate or sticking to teeth	

Clinical scoring scales for assessment of dry mouth

- Salivary hypofunction (dry mouth) can be scored clinically to record severity using a Clinical Oral Dryness Score (CODS)
- Xerostomia patients have been divided into three groups (CODS 1–3, 4–6 and 7–10). * = The mucosal wetness of the three patient groups was significantly less ($p < 0.05$) than the controls for each of the four mucosal surfaces.

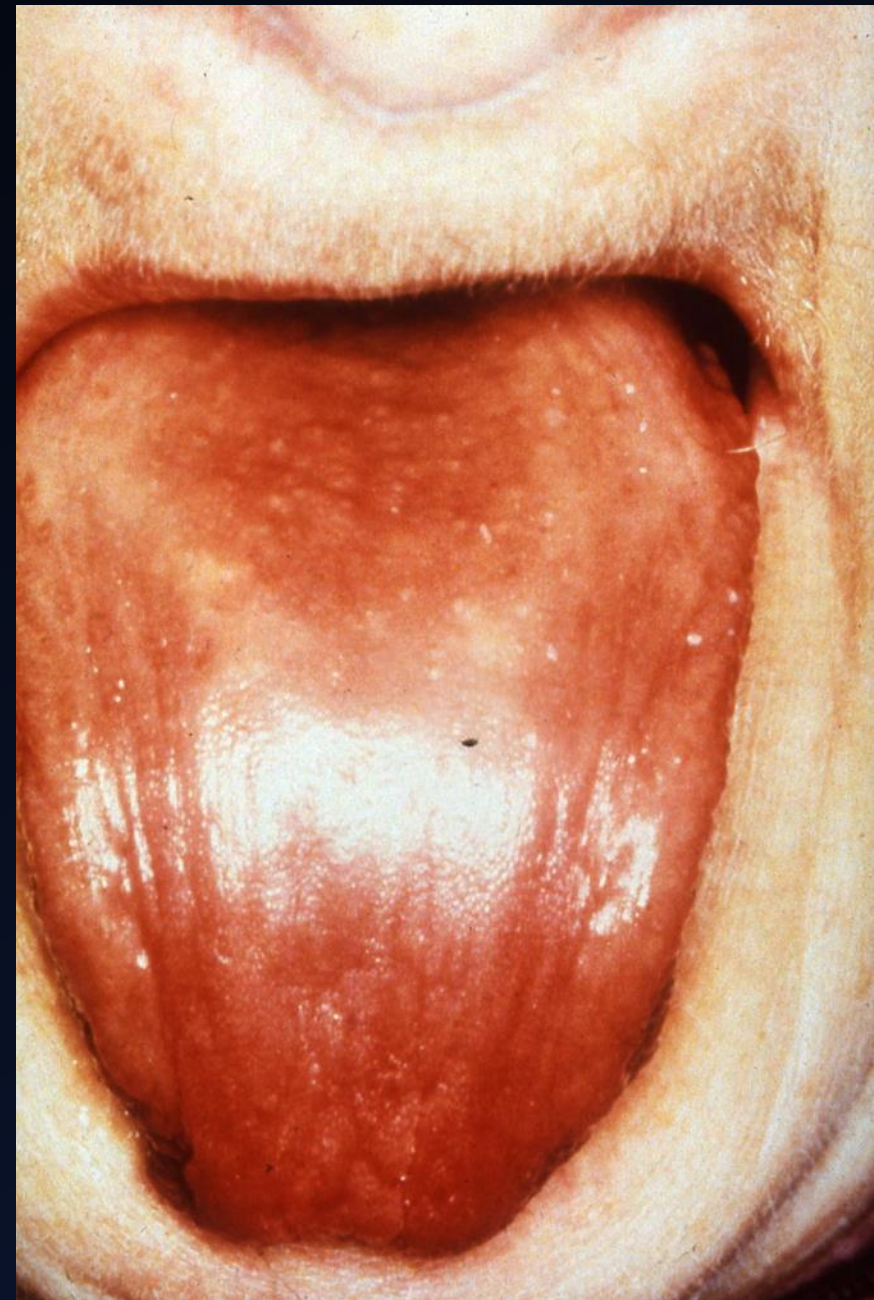
Signs of hyposalivation

Mild

- Frothing of saliva
- Mild depapillation of the tongue
- Thickening of saliva
- Dry lips

Severe

- Depapillation or erythema of the tongue
- Fissuring of tongue
- Atrophic mucosa
- Food debris and cervical caries







What does saliva do?

- Flow and swallowing eliminates food debris and bacteria
- Immunological protection, lubrication, digestion, taste, soft tissue repair, ecological balance (Ship 2002)
- Hypotonic aqueous solution containing, proteins, peptides, lipids, enzymes, hormones and ions (Baum 1993)
- Reservoir of ions which aid remineralization of calcified tissues
- Secretions protect oral mucosa from feeling dry and relates to quality of life

(Naito M, 2006, DiSabatato-Mordarski T 1996, Wolff M 1998)

Problems with dry mouth

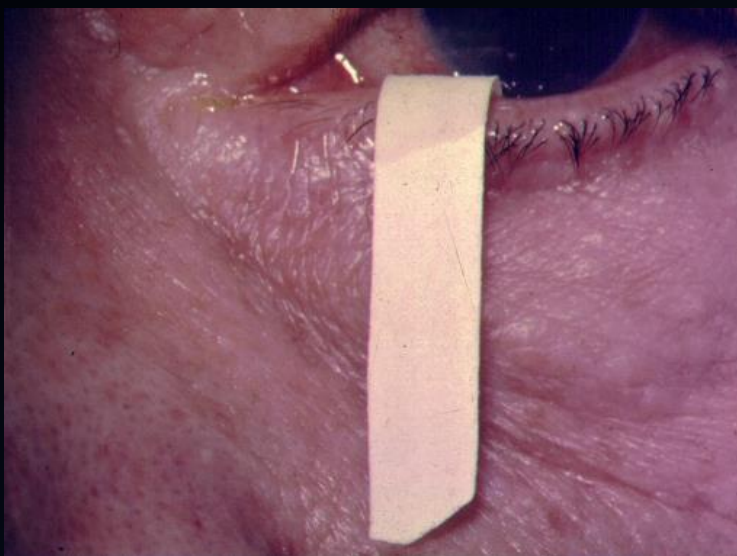
- Eating, speaking and wearing dentures
- Oral discomfort and poor oral health
- Expensive
- Inadequate social support
- Lack of empathy or commitment from health professionals
- Withdrawal from social situations due to eating and speaking difficulties and concerns re halitosis
- Salivary gland problems

Oral signs and consequences of Salivary Hypofunction

- Dryness, painful mouth, frictional ulcers
- Clicking speech
- Everything sticks in mouth
- Lobulated tongue
- Candidosis
- Caries, gum disease
- Salivary Gland Disease / Swellings

Sjogren's Syndrome

- Chronic multisystem autoimmune disorder in which immunocytes damage salivary, lacrimal and other exocrine glands
- It appears to be the result of lymphocyte-mediated destruction of exocrine glandular acini, which starts with periductal infiltration by B but later by T lymphocytes
- Primary Sjogren's is the second most common autoimmune disease (after rheumatoid disease) *Talal*
- Secondary is associated with RA, SLE, scleroderma & other connective tissue disorders



Sjogren's Syndrome...other signs & symptoms

- Problems of Rheumatoid & other associated disorders
- Eye problems
- Fatigue (70-80%) and “mind fog”
- Low grade fever
- Peripheral neuropathy
- Gastrointestinal, lung, thyroid problems
- General dryness, skin, throat etc
- Cutaneous vasculitis, palpable purpura
- Low mood (40%), difficulty socialising, problems in pregnancy

Ramos-Casalas BMJ 2012

Onset of Sjogren's...the patient's perspective

"Dry & tired!"

- Variable and insidious onset
- May be non-specific initial complaints such as tiredness, arthralgias, coughs rather than dry (or runny) eyes and dry mouth
- May be diagnosed as fibromyalgia or even depression with prescription of antidepressants, which further dry the mouth!

Testing for Sjogren's syndrome

Mavragani 2014

- Tests of dry mouth – salivary flow levels
- Test for dry eyes
- Full blood count, ANA, ENA – full screen, will include Ro and La antibodies, Rheumatoid factor, Hepatitis C, Immunoglobulin levels
- Minor salivary gland biopsy
- May check for IgG subtypes, amyloidosis, thyroid antibodies, sarcoidosis
- May undertake imaging of major salivary glands
- Investigation of systemic disease associated with Sjogren's syndrome

American-European criteria for classification of SS (2002)

- ocular symptoms
- oral symptoms
- ocular signs
 - schirmer (<5mm in 5 min) or Rose bengal
- oral signs
 - salivary flow (<1.5ml in 15 min) or sialography or scintigraphy
- lip biopsy
- autoantibodies : Ro/La (prev. RF or ANA)

$$4 / 6 = 1^*SS$$

Diagnosing Sjogren's Syndrome

- Time needed to explain condition and its effects on patients
- Education of patients on maintenance
- Aim of management is control rather than cure
- Need for team approach involving Rheumatology, Ophthalmology & other specialists
- Prevention of secondary complications of orofacial region requires active management

The patient with dry mouth in general practice

- Is it salivary hypofunction?
- WHY does the patient have this?
- Investigate for causes
- Manage symptoms and complications

Caries

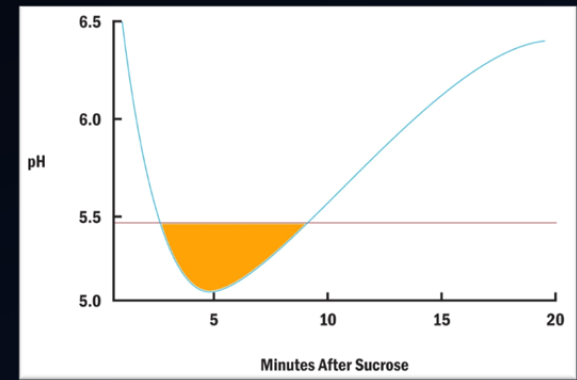




Dental caries and dry mouth

- Salivary proteins form a protective layer on the dental surface and protects against acid attack – thickness of this layer is lower in dry mouth
- Reduced buffering and pH in reduced salivation (usually increased salivary flow increases bicarbonate)
- Saliva dilutes acids
- Saliva removes particles from dental surfaces
- Saliva promotes re-mineralisation

pH of saliva



- The physiological pH increases with flow rate thereby maintain a pH in the range 6.6 to 7.4
- The bicarbonate-carbonic acid and phosphate have the most important buffer value for the regulation of saliva pH (Stephen, 1997). Hydrogen ions produced in the mouth react with saliva bicarbonate to form H_2CO_3 . The bicarbonate system can quickly neutralize strong acids in $\text{pH} \leq 6$ and is more effective than phosphate (Stephen, 1997)
- A number of observations have indicated that buffering capacity of saliva increases as the amount of saliva secretion increases
- BAKING SODA mouthwash – neutralises, mucolytic

Swellings of salivary glands



- Unilateral swellings can be mucosa-associated lymphoid tissue (MALT) lymphomas, infection or obstruction
- Check autoantibodies, immunoglobulin levels, CRP, IgG, C3, C4, ultrasound and check for salivary gland swellings if concerned about lymphoma
- Indicators of risk are: parotid swelling at first visit, palpable purpura, peripheral neuropathy, leucopenia and low C4 levels
- Massage of salivary glands on a weekly basis – stimulate, massage, get to know normal anatomy and recognise change

Salivary gland tumours

- Persistent swelling
- Facial palsy



Angular Cheilitis



Angular Cheilitis

- Caused by *S. aureus* or *Candida*
- Frequently denture related
- Sugar drinks & mints used to alleviate dryness & taste provide nutrition for *Candida* and reduce pH, increasing adherence
- Associated with low iron (other nutrients to a lesser extent) This can be due to chronic disease or difficulties eating due to dry mouth, dentures, immobility

Prophylaxis of Oral Candidosis

- Denture hygiene
- Diet
- Rinse after Steroid Inhalers
- Chlorhexidine
- Antifungals

Management of Dry Mouth

- Acknowledge patient difficulties



Comfort – dryness and friction – saliva required

Can they produce
saliva? Stimulate

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graph TD; A[Can they produce saliva? Stimulate] --> B[If yes, then stimulants will be beneficial]; B --> C[If no teeth, pH does not matter]
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If yes, then stimulants
will be beneficial

If no teeth, pH does
not matter

Stimulants

- Sugar free chewing gum
- Buffered acid lozenges
- Mucoadhesive stimulants
- Electro-stimulating intra-oral devices
- Medication (Pilocarpine) – eye drops in NZ

Chewing gum & lozenges

- Activates autonomic nervous system (like food)
- Works while chewing
- A more serous saliva, so not like unstimulated saliva – fewer mucins, may not be as effective with taste as not wetting floor of mouth
- pH is important
- Mucoadhesive product can help sleep as it gently stimulates over 4 hours

Xylimelts - online



Saliva substitutes – how well do they work?

- About 40% of patients with dry eyes “self-treat” with artificial tears (Clegg 2006)
- Hard to estimate the use of artificial saliva in patients, but pharmaceutical companies (UK) report low sales
- Thought that artificial saliva is too expensive and often ineffective
- Eye drops replace the aqueous component of the tear film as oil film is relatively intact, but saliva does not have an oil film and relies on proteins to provide lubrication

Other aspects of natural versus artificial saliva

- Preservatives and taste
- Older products with animal mucins, low pH
- Natural saliva has high calcium content but maintaining solubility for prolonged periods in artificial form is difficult
- The better saliva substitutes ideally have:

Bulk polymer such as hydroxycellulose

Active components lactoferrin, lactoperoxidase, lysozyme (Kirstila, V et al 1996)

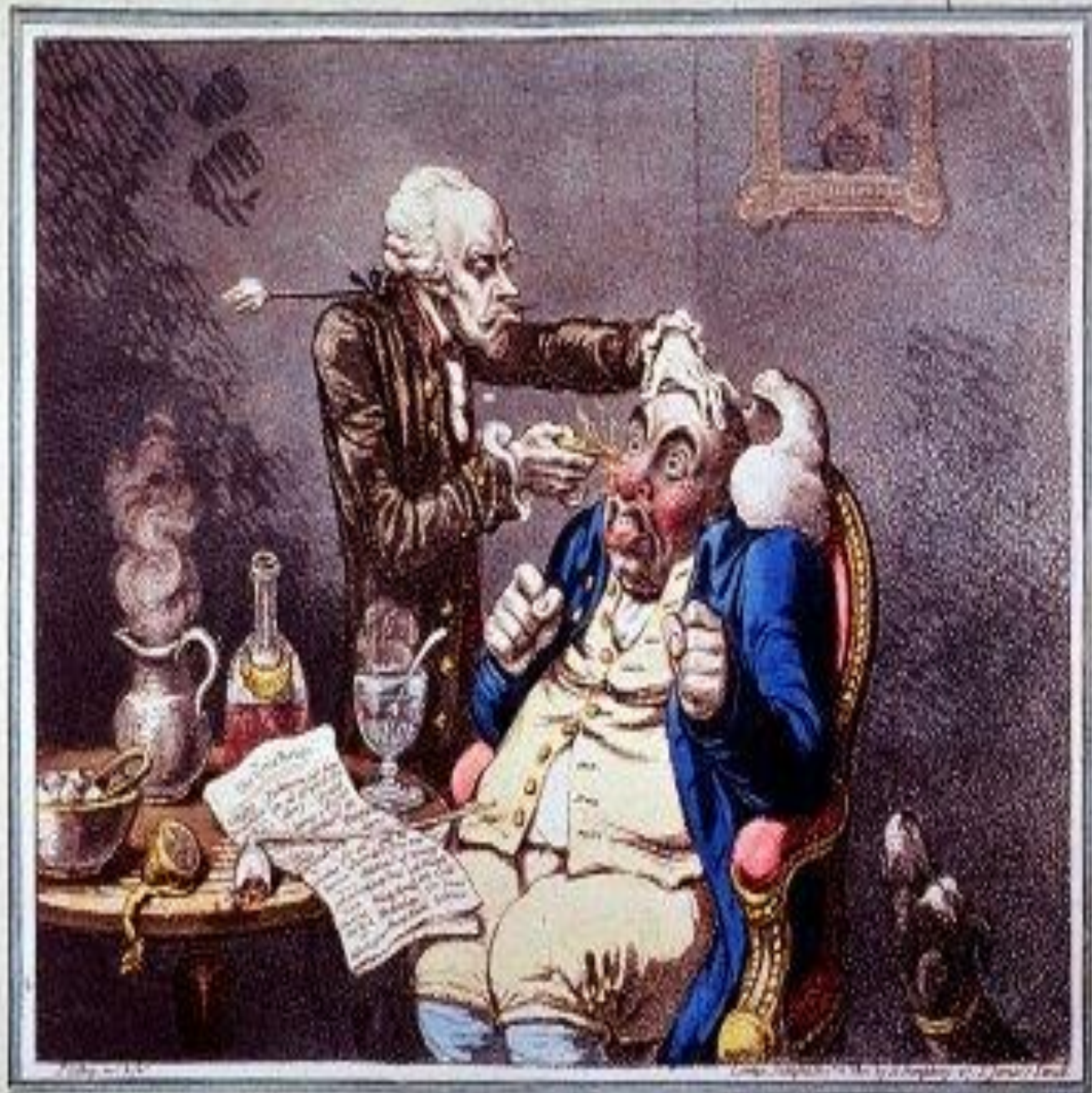
Mild taste

Advice for patients with dry mouth

- Adequate fluid intake
- Saliva substitutes – commercial, olive oil, coconut oil
- Saliva stimulants (sugar-free chewing gum, pH balanced stimulants, drugs such as pilocarpine)
- Fluid with meals, moist, creamy foods, cool juicy foods, use of sauces, gravy, dipping oils,, avoid spices
- Baking soda mouthwash after meals
- Drugs review
- Reduce alcohol, including alcohol containing mouthwashes, smoking cessation, manage mouth breathing

A Dry Mouth

- Can be difficult to diagnose and variable presentations
- There is no gold standard test – underlying cause of many systemic diseases
- The oral destruction can be progressive
- The aim of management is to ensure patients are comfortable, to monitor for serious complications and to prevent secondary damage
- A “HIDDEN DISABILITY” - nature of the condition means that patients have few reference points and discussing mouths is not acceptable to most people
- The clinician is seen as the main person from whom advice can be obtained and who will understand their challenges – availability and empathy
- A patient – clinician partnership



METALLIC TRACTORS.



Orofacial Pain

Persistent Orofacial Pain

Refers to a group of chronic disorders affecting the face and mouth and includes

- Temporomandibular disorders
- Burning Mouth Syndrome
- Trigeminal Neuralgia
- Persistent Dentoalveolar Disorder (PDAP)
- Persistent Idiopathic Facial Pain

Common (7% of UK population), huge impact on quality of life (social, emotional, financial), hard to communicate to health care professionals and family / friends

PINS AND NEEDLE

IN MY GUM PRICKING
me
CONTINUOUS PAIN

IN MY GUM DAY
AND NIGHT

MY SALIVA IS
CONTINUOUS

and IT IS VERY VERY
THICK LIKE PORRAGE

IT IS BECOMING
ON BECOMING
I AM SUFFERING BADLY

L. P. SELL

Temporomandibular disorders & Persistent Orofacial Pain

- Site of pain is a barrier to management as location suggests a dental route of care, but pain may share many qualities of other chronic illnesses
- Such chronic illnesses need more than one specialty or one professional's input and requires a **multidisciplinary** approach

Temporomandibular disorders

- A recognized chronic illness
- Classified as a musculoskeletal disorder within American Academy of Orofacial pain
- Suggested that it occurs in 20-75% of UK population, but only 2-4% present to clinics
- Clinicians find it difficult to explain or diagnose patients symptoms involving multiple visits to clinicians

Temporomandibular disorders

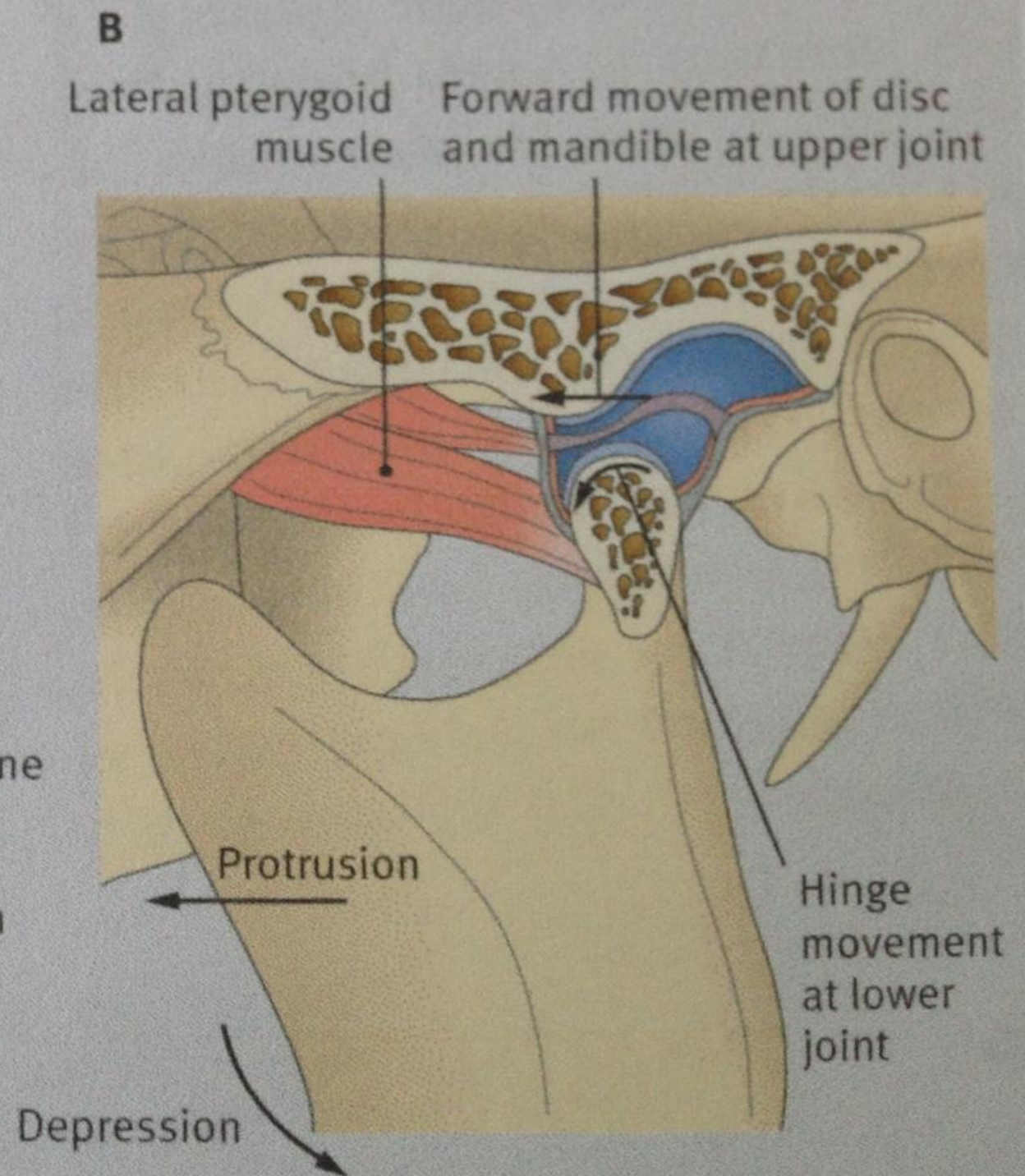
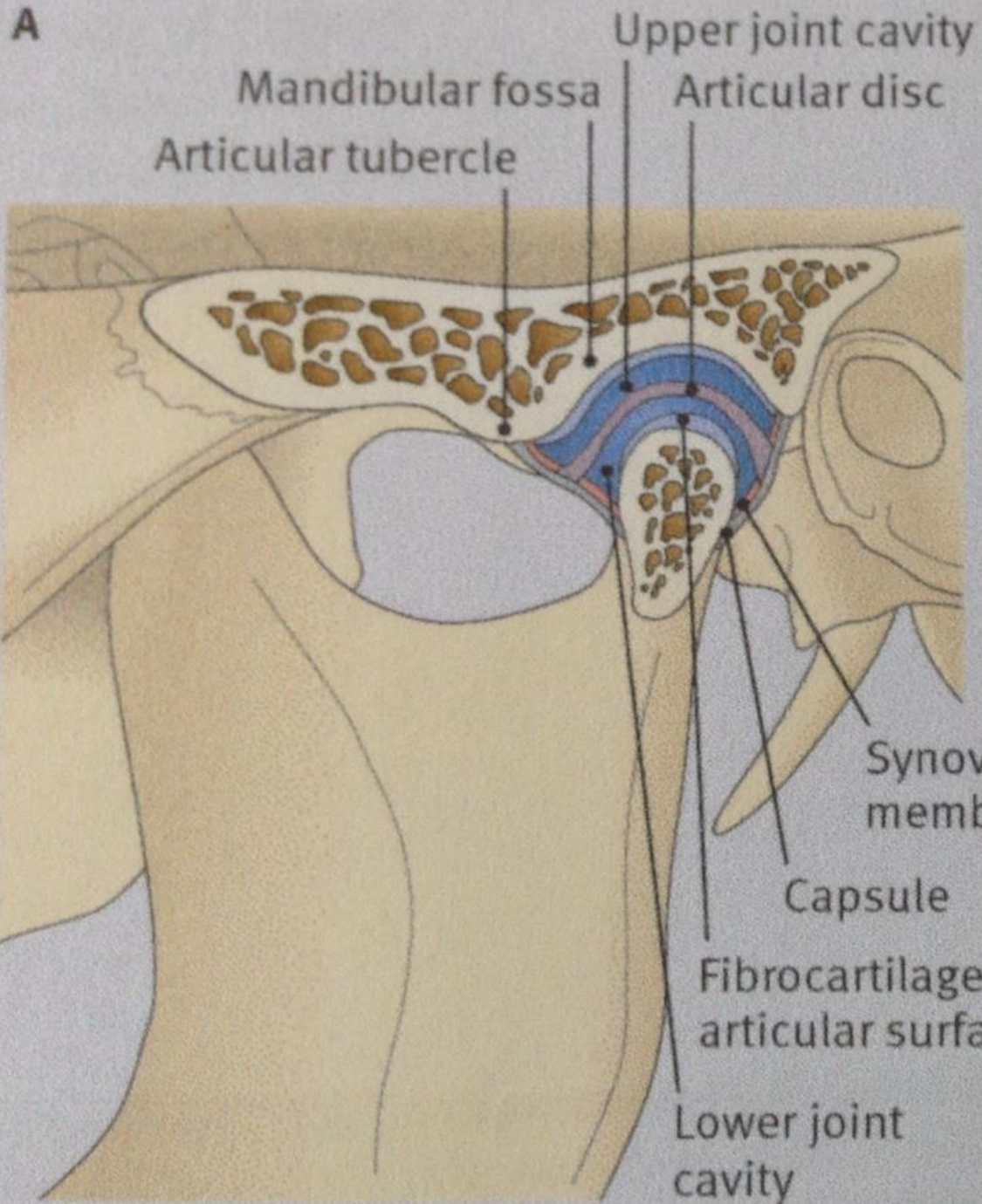
- An aggregate of clinical pain conditions that involve craniofacial muscles, the joint and associated structures
- Major source of non-dental pain in the orofacial region
- Although there may be specific causes such as degenerative arthritis or trauma, often the underlying cause is unclear, non-specific and multifactorial

Measure of Clinical Outcome

- *“As long as they are comfortable, that’s all I want really...I’m not after a silky smooth joint or anything...”*
(General Dentist)
- *“Success is a person who no longer needs to come and see me” (OMFS)*
- *“Realising that it’s perhaps never going to be cured” (RD)*

Temporomandibular joint

- A synovial joint
- Has ginglymo-arthrodial articulation (hinge-sliding)
- Fixed to the contralateral TMJ by the mandible
- Most active joint in body
- Can cause problems early in life so patients may have decades of problems
- High loads over a small articular surface
- The TMJ constantly remodels with changes in dentition and age...unlike hips and knees, the TMJ may spontaneously become painless over time and function normally again



Underlying TMJ problem

- Generally **muscular** cause (85%) – pain in masseters, clenching...can cause disc problem
- **Bone** problem (post-traumatic, inflammatory and wear arthritis)
- **Disc Problem** – clicking, closed lock – can open 2cm as hinge only
- All can cause pain, but conservative management in the absence of hard signs is the best initial management

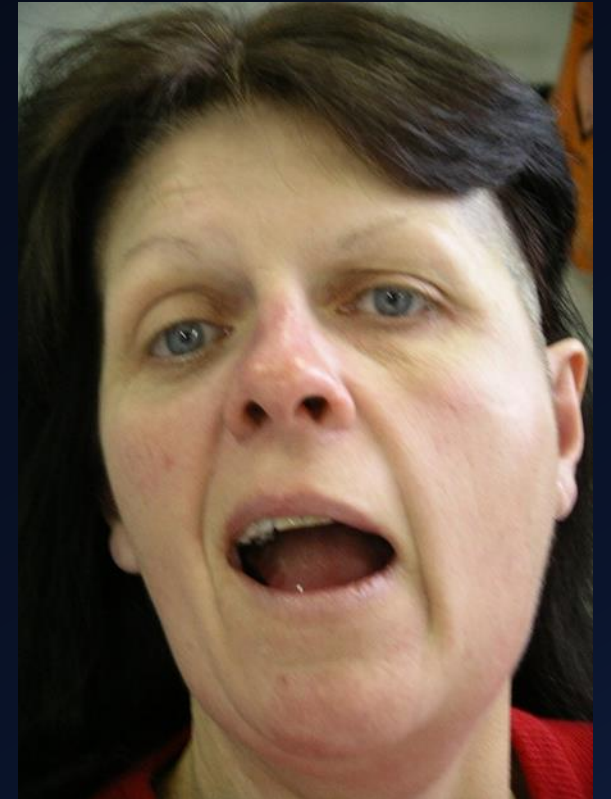
TMJ

- Treat symptoms
- Investigate signs

TMJ Examination

Hard Signs

- Tenderness directly over joint
- Clicking / Crepitus
- Deviation of mandible



Serious pathology of TMJ

- Accounts for <1% of all head & neck tumours
- Metastases most likely from breast, lung, prostate, thyroid and kidney

Red flag signs include:

- New TMD in advanced age group
- Ipsilateral lymphadenopathy or cranial nerve defect
- History of malignancy elsewhere
- Profound trismus
- Ipsilateral epistaxis, purulent discharge, hearing loss, anosmia

TMJ Investigations

- Plain radiographs ..OPG views rarely of use
- MRI (non invasive, no ionizing radiation, hard & soft tissues, can distinguish disc from its attachment)
- CT (Gives excellent bony detail)
- Arthroscopy
- Ziad Al-Ani et al. TMD Current Concepts: Imaging and Treatment Options. An Update. Dental Update 2007;34:356-370

Management (often empirical)

- Reassurance and explanation
- Home jaw exercises
- Bite splint therapy simplest being lower soft splint. With other splints beware of occlusal changes, although full-coverage of teeth reduces risk
- Physiotherapy / chiropractic treatment
- Medications e.g. analgesics, benzodiazepines, older tricyclic antidepressants
- Psychological management
- Long term medical care

Surgical Management

- Arthroscopy
- Arthrocentesis. An option that may be considered between failed conservative and invasive treatment. The joint is flushed out and there was a reported reduction in medication use for pain (Chulan 2004). It may not be so useful for disc repositioning
- Disc anchoring...makes sense, yet follow up did not necessarily have a better outcome compared with conservative management (Lyons 2008)
- Total Jaw Replacement



What are the pointers to TMD becoming chronic?

- Females with myogenous TMD
- Increasing age at presentation
- Higher pain scores
- Higher pain interference
- More widespread & non-specific symptoms or a high number of pain locations
- Concurrent psychiatric diagnosis or mood disturbance

Durham J et al :Temporomandibular disorders; BMJ 12 March 2015 pages 2-9

Mouth guards / Splints



Oral Cavity

- The mouth mirrors many systemic diseases, so it can be useful diagnostically and prognostically.
- Failure to consider the oral cavity may sometimes lead to further morbidity
- The mouth is frequently forgotten in medical treatment plans

Oral Hints of Systemic Disease

- Richter's transformation of CLL
- Nutrition
- Gastrointestinal, hypersensitivity – Crohn's, OFG
- Vesiculobullous
- Dry mouth – a sign of many diseases & complications
- Facial Pain – systemic disease or stress anxiety

An Irish Toast

The Health of The Salmon to You

A Long Life

A Full Heart

And a Wet Mouth

