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# Secretion Management in MND?

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## This Session

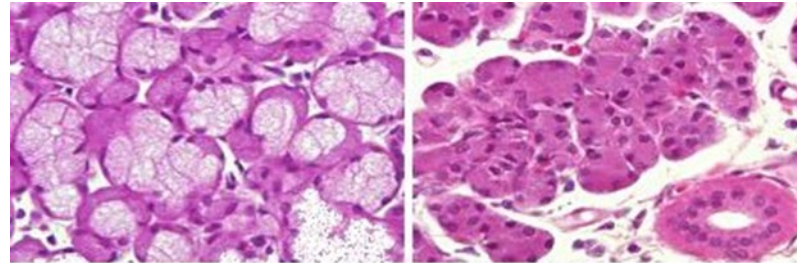
### Sialorrhoea

- Conservative measures
- Thin Saliva
  - Medication, dosage, side effects
- Thick Saliva
  - Medication, dosage, side effects
- Building a pathway to fit local services



## The salivary glands

- Parotid - Watery, serous secretion
- Submandibular – Mixed serous and mucous secretion
- Sublingual – Mucous secretions



Mandibular gland (mixed)

Parotid gland (serous)

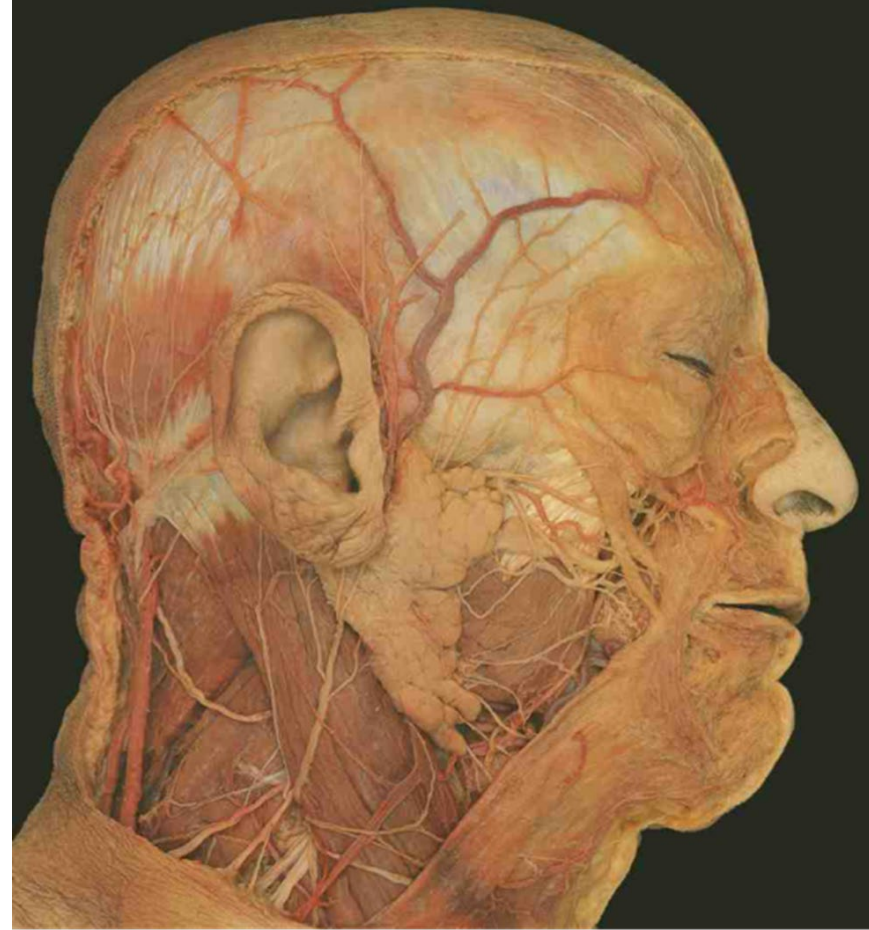


## Production of saliva

- Controlled by autonomic NS, mediated by adrenergic and cholinergic nerve endings, primarily under parasympathetic control
- 70% of unstimulated saliva production from submandibular and sublingual glands 20% from parotid 10% from minor secretory glands
- Most stimulated saliva production comes from parotid
- Stimulated flow is 5x greater than unstimulated flow



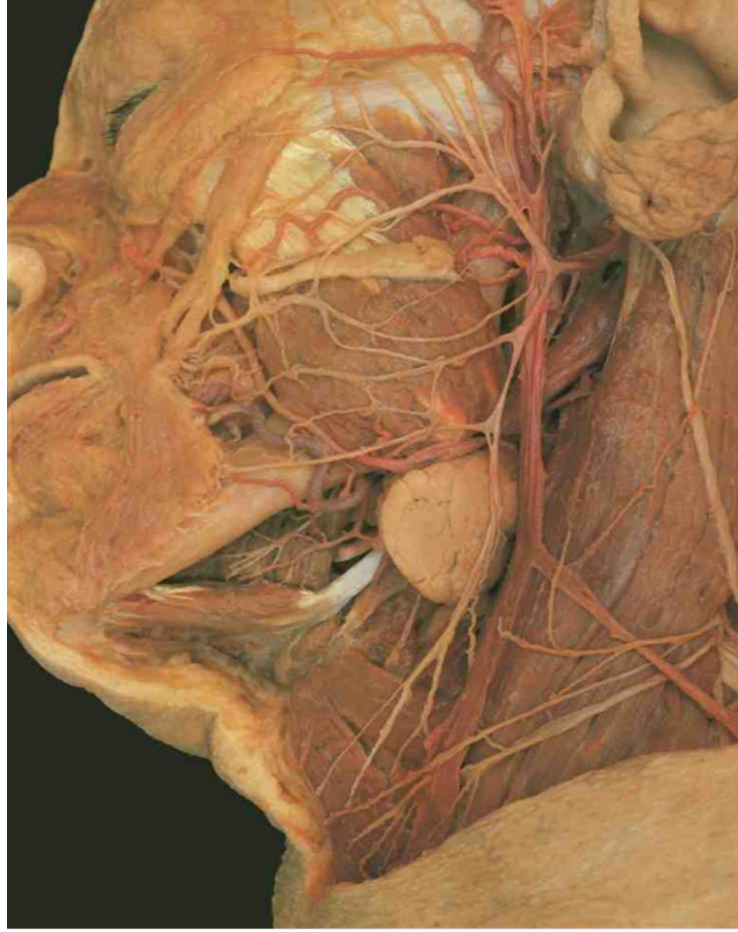
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## Parasympathetic control of saliva

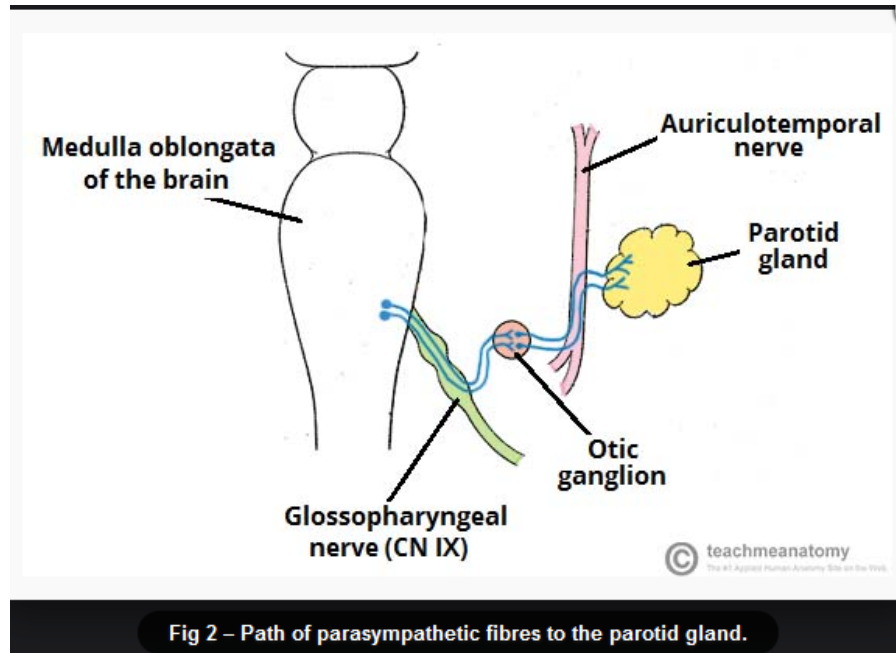


Fig 2 – Path of parasympathetic fibres to the parotid gland.

- PSN co-ordinated by centres in medulla
- stimulated by facial & glossopharyngeal nerve
- Stimulation of PSN releases Ach which acts on Muscarinic receptors
- Muscarinic receptors
  - Increase production of saliva
  - Increase blood flow to saliva glands
  - Cause contraction of myoepithelium
  - Increased rate of expulsion of saliva



# Conservative measures

## Thin saliva

- Positioning
- SALT interventions
- Hydration
- Cough augmentation
- Oral Hygiene
- Equipment
- Review current medication



## Treatment of thin saliva

- Anticholinergic drugs
- Can be effective but risk of significant side-effects
- Side-effects compounded by common medications; antihistamines, neuroleptics, sedatives
- Cannot be given to patients with glaucoma, obstructive uropathy, gastrointestinal motility problems, myasthenia gravis



YachtPals.com



## Muscarinic receptors

- Eyes
- Glandular secretion
- Cardiovascular
- GI
- Bladder
- Lungs
- CNS



Very important to remember this when thinking about side effects



## Antimuscarinic medication side effects

Eyes	Pupillary dilatation, blurred vision
Cardiovascular	Increase in heart rate
GI	Constipation
Bladder	Urinary retention
Respiratory	Bronchodilation and drying of secretions
CNS	Antiemetic properties, drowsiness, confusion
Glandular secretion	<b>Reduction in saliva production</b>



# Amitriptyline

## Dose

- Usual dose 10mg nocte]
- Max dose for saliva control 50mg
- Dose as an antidepressant 150mg / daily

## Side effects

- Drowsy
- Cognitive confusion
- Cardiac changes
- Constipation
- Urinary retention
- Blurred vision - avoid in A A Glaucoma

## Notes

- Useful as first line medication
- Only given at night
- Mild sedative effect
- Helps with pain
- Dose usually too small to help with emotional lability
  
- Crosses easily into the brain so use cautiously in people with cognitive change and stop immediately if patients hallucinate or become confused



# Hyoscine Hydrobromide Patches

## Dose

- 1mg/ 72 hours patch

## Side effects

- Cardiac changes – tachycardia
- Palpitations
- Sweating / feeling hot
- Blurred vision
- Dizziness
- Drowsiness
- Urinary retention
- Constipation
- Vomiting

## Notes

- Easy to administer
- Patch can be cut if smaller dose required
- Needs changing only every 3 days
- Patches take up to 6 hours to work fully
  
- Frequently people experience skin reactions to the adhesive in the patch and it can blister the skin.
- Steroid cream can help to reduce skin reactions but often the skin irritation causes the person to decline further use
- More commonly causes confusion and drowsiness in elderly population
- Avoid in people with cognitive change



# Hyoscine Butylbromide- Buscopan

## Dose

- Usual dose 20mg TDS
- Maximum dose 20mg QDS

## Side effects

- Cardiac changes – tachycardia
- Palpitations
- Sweating / feeling hot
- Blurred vision
- Dizziness
- Drowsiness
- Urinary retention
- Constipation
- Vomiting

## Notes

- Not used commonly for sialorrhea
- Caution when giving IV ; Risk of serious adverse effects in people with underlying cardiac disease / undiagnosed cardiac disease



# Hyoscine hydrobromide Tablets - Kwells

## Dose

- Comes ad either 150mcg or 300mcg TDS

## Side effects

- Drowsiness
- Confusion
- Constipation
- Tachycardia
- Blurred vision
- Urinary retention

## Notes

- Can be bought over the counter
- Can be sucked, chewed or swallowed
  
- Is also a bromide drug so can effect libido





# Glycopyrronium Bromide

## Dose

- 0.5 mg -2 mg three times a day orally / via peg
- 200 – 1.2mg via subcutaneous pump over 24hrs

Maximum dose would be 2.5mg TDS orally and should be given at least 1 hour before, or 2 hours after, meals.

## Side effects

- Cardiac changes – tachycardia
- Palpitations
- Blurred vision – avoid in A A Glaucoma
- Dizziness
- Urinary retention
- Constipation

## Notes

- Glycopyrronium bromide is a bigger molecule so less likely to pass into brain so N.I.C.E recommended first line treatment for people with cognitive impairment
- More commonly causes urinary retention and constipation
- As a bromide it can and does effect libido so do check with patients and stop if this becomes an issue.
- GP's might not be happy to prescribe as a solution as it is expensive and solution only stable for 28 days



## Atropine eye drops

### Dose

- Usual dose 2 drops sublingually
- Maximum dose 2 drops TDS

### Side effects

- Cardiac changes – tachycardia
- Palpitations
- Blurred vision - avoid in A A Glaucoma
- Dizziness
- Urinary retention
- Constipation

### Notes

- Good for short acting effect, ie before moving / bending over to reduce risk of drooling on family / carers
- Difficult to administer independently
- Risk of overdose as difficult to control drops
- Needs to be applied under the tongue to a dry mouth – need to remove secretions first to increase absorption
- Can cause confusion in the elderly and those with cognitive changes



## Botulinum Toxin

- First recorded In 1822
- Botox binds selectively to cholinergic nerve terminals at presynaptic membrane
- It inhibits ACh release, reduced function of parasympathetic controlled endocrine glands
- Blockade is irreversible but temporary



Estimated cost of £2.4k/patient/year (Hertfordshire Medicines Management Committee – Sept 2012)



## A or B ?

### **Botulinum Toxin A Versus B in Sialorrhea: A Prospective, Randomized, Double-Blind, Crossover Pilot Study in Patients with Amyotrophic Lateral Sclerosis or Parkinson's Disease**

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Movement Disorders p313-319 Vol. 26, No.2, 2011



## Not for everyone?

### Pros

- Effect lasts for 8-12 weeks
- Reduces the need for administration of medication
- Good for people who live alone
- Easy to administer in clinic

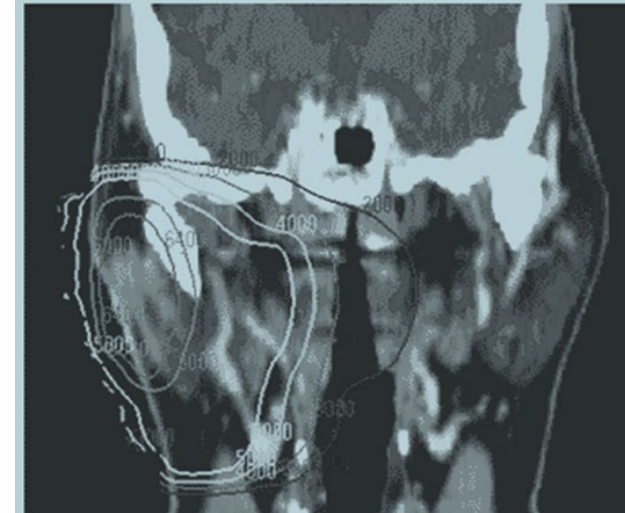
### Cons

- Lasts for 8-12 weeks
- Temporarily irreversible
- Needs access to hospital to administer
- Difficult to access at end of life?
- May make secretions thicker?



## Radiotherapy

- Local irradiation of the parotid gland
- Xerostomia, dental caries, hyperpigmentation, burns, mucositis
- Malignancy 10-15 years post-treatment
- Restricted to elderly with severe drooling where surgery is not an option and medication is contraindicated





## Thick Saliva

- Medication review
- Hydration
- Positional
- Cough augmentation
- Cough assist device
- Humidification for NIV machines
- Saline Nebulisers
- Suction equipment
- Low foaming toothpaste
- Suction toothbrushes
- Carbocisteine 375 -750 mg TDS
- Can be given with anticholinergic medication
- Submandibular Botox
- Complementary medicine
  - Hedera helix
  - Pelargonium
  - Papain Enzyme
  - Kali B





## Building a pathway

- Least interventional
- Ease of access / application
- Least side effects
- Thinking ahead to access specialist services



# Queens Square Saliva flow chart

## Thin Saliva

Conservative measures	Positional changes, hydration, SALT assessment, cough augmentation
Amitriptyline 10 mg Nocte	Avoid in frail elderly and those with cognitive change
Hyoscine transdermal patch 1mg / 72 hours	Avoid in frail elderly and those with cognitive change
Hyoscine (Kwells) 300mcg TDS	Avoid in frail elderly and those with cognitive change
Hyoscine (Buscopan)	Avoid in frail elderly and those with cognitive change
Glycopyrronium 0.5-2 mg TDS	First line treatment for those with cognitive change
Atropine drops 2 drops BD	Used more as adjunct, think about application
Xeomin Botulinum Toxin A	30 units to each parotid and 20 units to submandibular glands
Radiotherapy Total dose 12 Gy	



# Queens Square Saliva flow chart

## Thick Saliva

Conservative measures	Positional changes, hydration, humidification, cough augmentation, complementary approach, Biozoom usage
Carbocisteine 750 mg TDS	



## References

McGeachan AJ, McDermot CJ. Management of oral secretions in neurological disease. *Pract Neurol* 2017;17:96-103

Hobson EV, McGeachan A, al-Chalabi A, *et al.* Management of siallorhea in motor neuron disease: a survey of current UK practice. *Amyotroph lateral scler Frontotemporal Degener* 2013;14: 521-527

Saliva management pathway  
South Wales MND care network  
Version 1 May 2019