



*Evaluation and Management of
Drooling*

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May 05, 1999



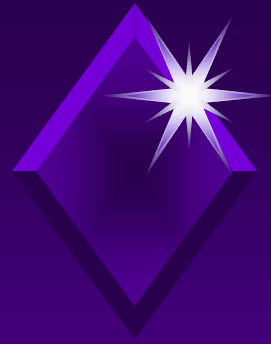
Drooling

- ◆ Drooling - serious medical and social problem
 - ◆ maceration, infection, soiling of clothes and belongings, effects on caregiver
- ◆ Sialorrhea - increase in salivary flow
- ◆ Drooling - ineffective saliva management



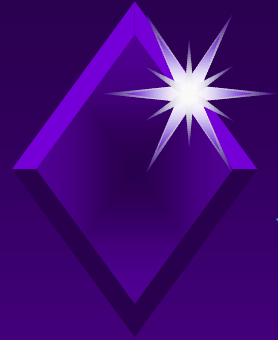
Anatomy and Physiology of Drooling

- ◆ Three pairs of major salivary glands - parotid, submandibular, and lingual
- ◆ 70% of saliva comes from the submandibular glands at the resting state
- ◆ Ingestion of food causes parotid gland to secrete a higher percentage of saliva



Submandibular and Sublingual gland innervation

- ◆ Superior salivatory nucleus - nervus intermedius - facial nerve - chorda tympani - lingual nerve - submandibular ganglion - submandibular/lingual glands



Parotid innervation

- ◆ Inferior salivatory nucleus -
glossopharyngeal nerve - Jacobsen's nerve -
lesser superficial petrosal nerve - otic
ganglion - auriculotemporal nerve



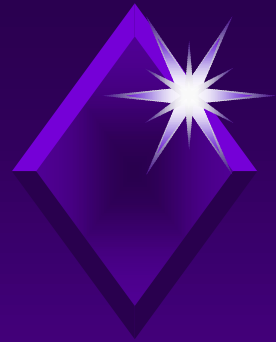
Salivary gland innervation

- ◆ Parasympathetic system stimulation causes an increase in saliva flow from all glands
- ◆ Sympathetic system stimulation causes increase in saliva flow from submandibular gland but has no effect on parotid flow



Functions of saliva

- ◆ Protective
- ◆ Swallowing
- ◆ Digestion
- ◆ Speaking



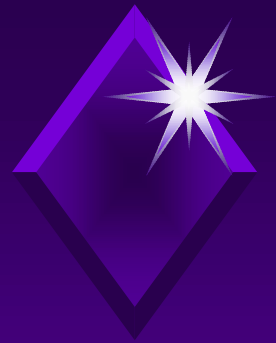
Etiology of Drooling

◆ Acute vs. Chronic

- ◆ acute - epiglottitis, neoplasm, abscess
- ◆ chronic - neurological (cerebral palsy) most common; usually related to head control

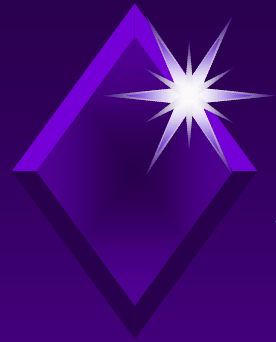
◆ Direct vs. Indirect

- ◆ direct - directly interferes with muscle tone or gland stimulation (anticholinesterase)
- ◆ indirect - macroglossia



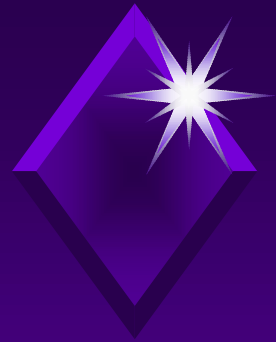
Pathophysiology of Drooling

- ◆ Multifactorial
- ◆ Primarily a defect in the oral phase of swallowing caused by:
 - ◆ poor head control, inability to close the mouth, abnormal tongue mobility, reduced intra-oral sensation
- ◆ Sialorrhea can lead to drooling caused by:
 - ◆ medications and poor fitting dentures



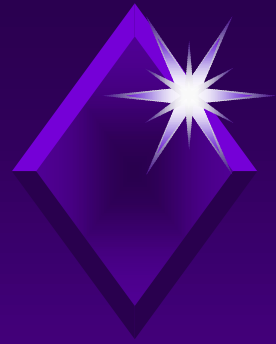
Diagnosis of Drooling

- ◆ History - severity, peak time, influencing factors, associated conditions, parental expectations, age and mental status of the patient
- ◆ Physical - Head posture, dental abnormalities, nasal and oral cavities, decreased intraoral sensitivity
- ◆ Other - lateral neck x-ray, audio, barium sw.



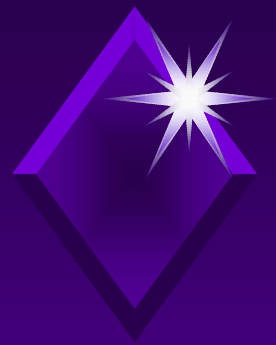
Treatment Options

- ◆ Pharmacological therapy
- ◆ Speech therapy
- ◆ Behavioral therapy
- ◆ Radiation therapy
- ◆ Surgery
- ◆ Initial approach is usually nonsurgical and reversible



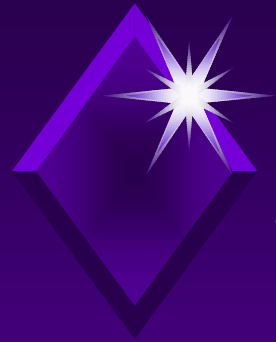
Pharmacological therapy

- ◆ Anticholinergic - Robinul
 - ◆ side effects - restlessness, sedation, constipation, urinary retention, blurred vision, xerostomia
- ◆ Antihistamine
- ◆ Antireflux



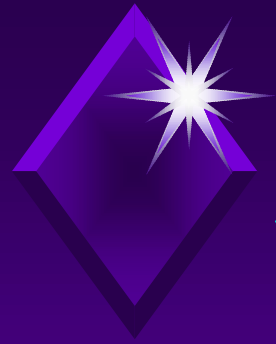
Speech therapy

- ◆ Goal is to improve jaw stability and closure, increase tongue mobility, improve lip closure, decrease nasal regurgitation
- ◆ Usually not a significant impact as sole tx.
- ◆ Begin early (infancy)
- ◆ Limited results in severely retarded
- ◆ Prosthetic devices - chin cup



Behavioral therapy

- ◆ Cueing, overcorrection, positive and negative feedback
- ◆ Three phases : cognitive, fixation, and autonomous
- ◆ Not used widely because time intensive and requires certain intelligence level
- ◆ Regression can occur after cessation of tx



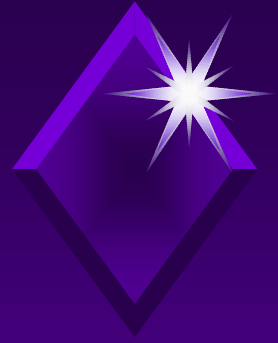
Radiotherapy

- ◆ 6000 rad
- ◆ Side effects: xerostomia, mucositis, caries, osteoradionecrosis, development of radiation induced malignancy
- ◆ Relapse rate - 5/32 patients relapsed within 6 months



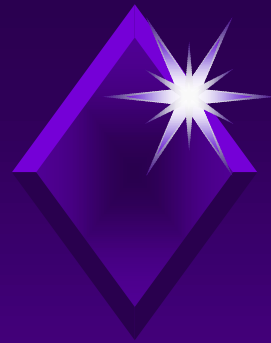
Surgical options

- ◆ Submandibular duct rerouting
- ◆ Submandibular duct excision
- ◆ Parotid duct ligation
- ◆ Transtympanic neurectomy



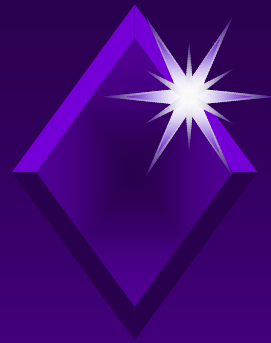
Surgical indications

- ◆ Age 5-6
- ◆ Assess ability to interact with peers
- ◆ Failed nonsurgical management
- ◆ Stable neurological status



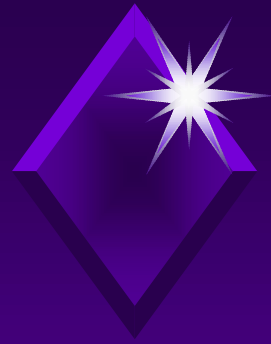
Rerouting of submandibular duct

- ◆ Success rate of 80-100%
- ◆ Cuff of mucosa dissected around duct and marked medially and laterally
- ◆ Duct dissected 3-4 cm or until gland reached
- ◆ Tonsil used to create a tunnel just posterior to anterior tonsillar pillar and sutures passed with duct



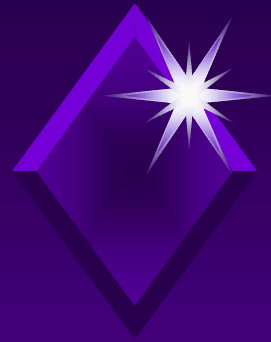
Rerouting of submandibular duct(cont'd)

- ◆ Tonsillectomy performed if obstructive tonsils
- ◆ Sublingual adenectomy(Crysdale) versus ligating sublingual ductules(Cotton)
- ◆ Advantages: Decreased xerostomia, problems with taste and dysphagia
- ◆ Disadv: Ranula, FOM swelling, sialoadenitis, sialolithiasis, aspiration



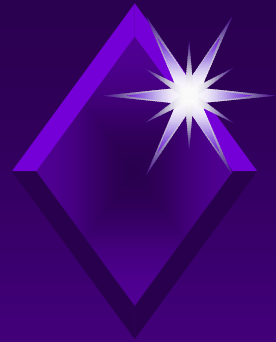
Studies on submandibular duct rerouting

- ◆ Crysedale - 8% ranula rate
- ◆ O'Dywer - 15 year follow -up study, 94% of parents stated their child benefited, 50% had complete cessation of drooling



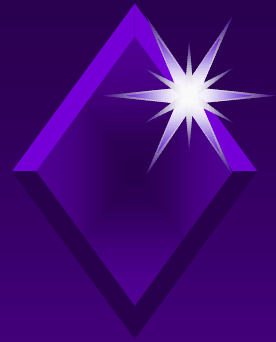
Submandibular Gland Excision

- ◆ Performed if rerouting fails or high risk for aspiration
- ◆ Done in the standard fashion through neck incision
- ◆ Can be done with or without parotid duct ligation
- ◆ High success rate(approx. 85%)



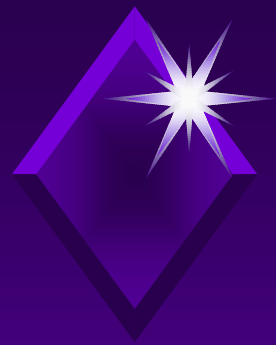
Parotid duct ligation

- ◆ If combined with submandibular gland excision can lead to significant xerostomia
- ◆ Elliptical incision made around the parotid duct. Duct dissected for 1 cm, suture ligated and resected. The buccal mucosa is then repaired.
- ◆ Can lead to parotitis, sialolithiasis



Transtympanic neurectomies

- ◆ 80% success rate quoted
- ◆ Must take both chorda and tympanic plexus
- ◆ Hypotympanic branch in 50% of patients
- ◆ Low speed drill
- ◆ Loss of taste in anterior 2/3 of tongue and xerostomia
- ◆ Contraindicated in unilateral SNHL



Summary

- ◆ Goal: decrease drooling and provide healthy oral cavity
- ◆ Order of management controversial
 - ◆ Nonsurgical management first
 - ◆ Submandibular duct rerouting
 - ◆ Submandibular gland excision +/- parotid duct ligation
 - ◆ Tympanic neurectomy