Radiotherapy in Oral Cancer

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Common sites & subsites

- Ant 2/3 Tongue
- Lip
- Floor of mouth
- Buccal mucosa
- Retromolar trigone
- Gum/ Alveolus

Staging

American Joint Committee on Cancer (AJCC)
TNM Staging Classification for the Lip and Oral Cavity
(7th ed., 2010)
(Nonepithelial tumors such as those of lymphoid tissue, soft tissue, bone, and cartilage are not included)

Primary Tumor (T)

TX	Primary tumor cannot be assessed
T0	No evidence of primary tumor
Tis	Carcinoma *in situ*
T1	Tumor 2 cm or less in greatest dimension
T2	Tumor more than 2 cm but not more than 4 cm in greatest dimension
T3	Tumor more than 4 cm in greatest dimension
T4a	Moderately advanced local disease* (lip) Tumor invades through cortical bone, inferior alveolar nerve, floor of mouth, or skin of face, that is, chin or nose (oral cavity) Tumor invades adjacent structures (eg, through cortical bone [mandible or maxilla] into deep [extrinsic] muscle of tongue [genioglossus, hyoglossus, palatoglossus, and styloglossus], maxillary sinus, skin of face)
T4b	Very advanced local disease Tumor invades masticator space, pterygoid plates, or skull base and/or encases internal carotid artery

*Note: Superficial erosion alone of bone/tooth socket by gingival primary is not sufficient to classify a tumor as T4.

Regional Lymph Nodes (N)

NX	Regional lymph nodes cannot be assessed
N0	No regional lymph node metastasis
N1	Metastasis in a single ipsilateral lymph node, 3 cm or less in greatest dimension
N2	Metastasis in a single ipsilateral lymph node, more than 3 cm but not more than 6 cm in greatest dimension; or in multiple ipsilateral lymph nodes, none more than 6 cm in greatest dimension; or in bilateral or contralateral lymph nodes, none more than 6 cm in greatest dimension
N2a	Metastasis in single ipsilateral lymph node more than 3 cm but not more than 6 cm in greatest dimension
N2b	Metastasis in multiple ipsilateral lymph nodes, none more than 6 cm in greatest dimension
N2c	Metastasis in bilateral or contralateral lymph nodes, none more than 6 cm in greatest dimension
N3	Metastasis in a lymph node more than 6 cm in greatest dimension

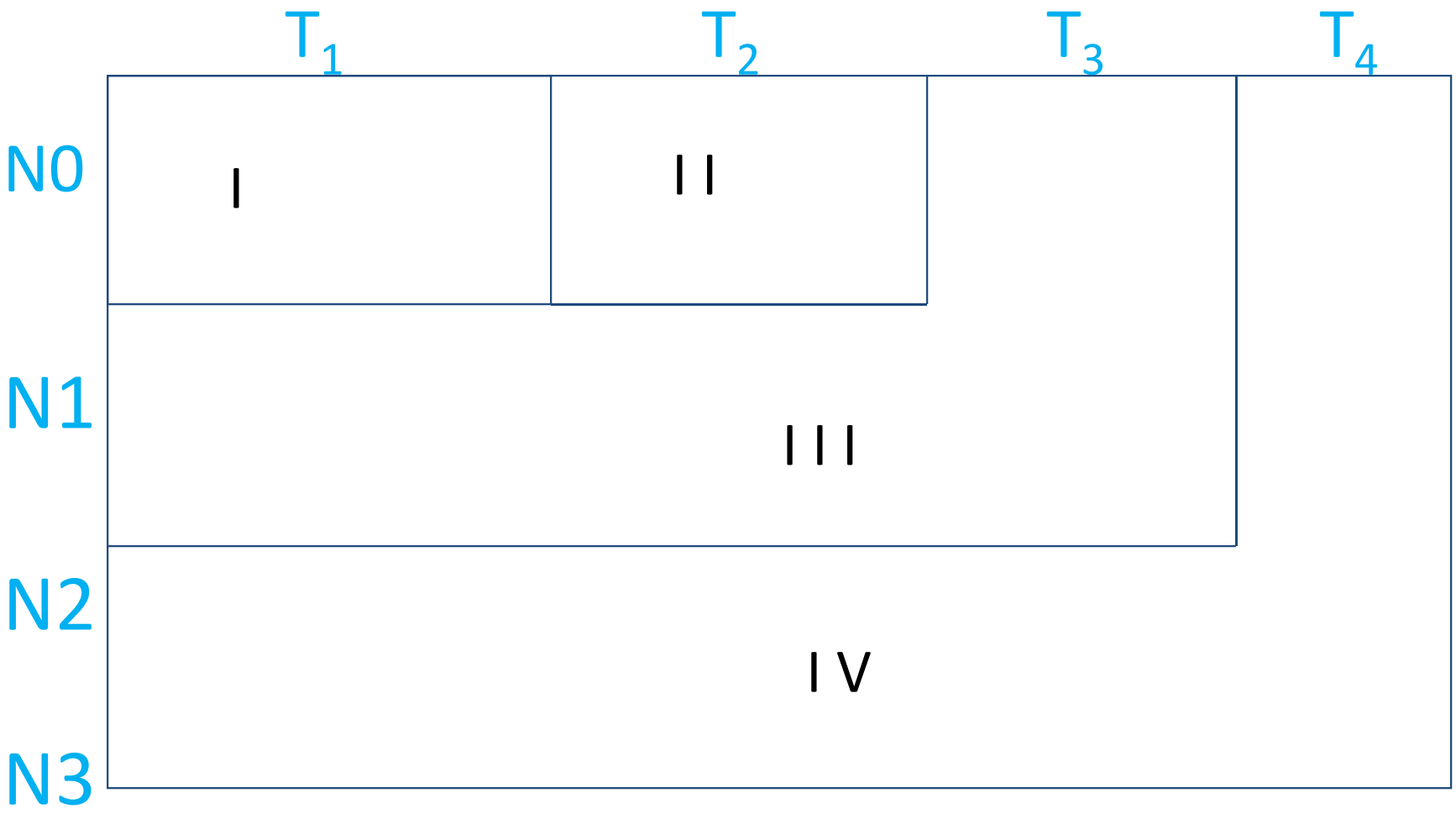
Distant Metastasis (M)

M0	No distant metastasis
M1	Distant metastasis

Histologic Grade (G)

GX	Grade cannot be assessed
G1	Well differentiated
G2	Moderately differentiated
G3	Poorly differentiated
G4	Undifferentiated

Stage Grouping



Control rates

- STAGE I 90%-95%
- STAGE II 60 – 70%
- STAGE III 30 – 40 %
- STAGE IV 20 – 30 %

Head and Neck Cancer: Multi-Disciplinary Team

- Oncologist: Radiation/Surgical/Medical
- Plastic Surgeon
- Dental Surgeon
- Nutritionist
- Nursing
- Occupational/ Speech therapist

Oral Cavity: Treatment paradigm

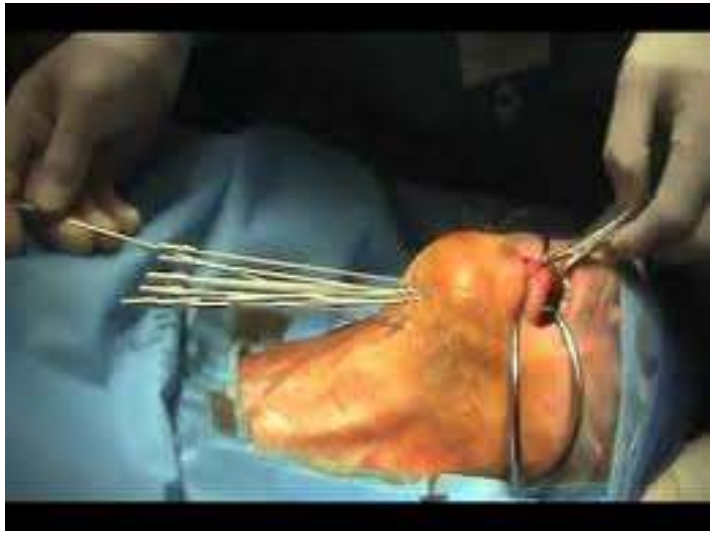
SITE	PRIMARY TUMOR	NODAL DISEASE
Lip	**Early** :Surgery OR RT **Advanced:** Surgery + RT	•Ipsilateral LN done if N+ •Ipsilateral LN irradiation only
Cheek	**Early** :Surgery OR RT **Advanced** :Surgery+ RT	•Ipsilateral ND done if N+ •Ipsilateral LN irradiation only
Tongue—ant- 2/3	**Early** :Surgery or RT (EBRT/ BT) **Advanced** :Surgery + RT	•Bilateral node dissection (if N+ve), unilateral (if N0) •Post op RT if margin +ve / poorly diff./ depth of infiltration > 8mm •Bilateral LN levels to be irradiated
Floor of mouth	**Early**: RT OR Surgery **Advanced:** Surgery+ RT	•Neck node dissection (for N+) should be bilateral. •Bilateral LN irradiation is indicated.

Indications for RT

- Radical treatment (medically inoperable cases)
- Post-operative treatment (advanced cases)
- Palliative

Indications for Brachytherapy

- As sole therapy: early T1 & T2 lesions.



- As boost: in suitable late T2 & T3 tumors it is combined with EBRT as a Boost.

Radical RT doses

Radiotherapy Doses

- Primary Tumor and Enlarged Nodes → 66-70 Gy/33-35#/7 weeks
- Microscopic Disease → 50 Gy/25#/5 weeks

- Postoperative → 60 Gy/30#/6 weeks

Post-operative RT Indications

Postoperative Radiotherapy

- T3,T4 primary
- High grade
- Infiltration of soft tissues/ muscle/ bone
- Perineural invasion
- Lymphovascular emboli
- Cut margin positive/ close
- Thickness/ depth
- Recurrent disease
- Multiple nodes

Perinodal extension ⇒ Indication for post-op CT-RT

Palliative radiotherapy

Symptoms:

Bleeding

Fungation

Pain

Volume:

Gross disease with min margins

Dose:

30 Gy /10 #/ 2 weeks

Pre-Radiotherapy preparations

Pre-treatment assessment

- Single most important step in any planned brachytherapy procedure.
- Preferably EUA by multidisciplinary team.
- CT and/or MRI scans accurately assess the primary tumor volume & integrity of adjacent structures like bone & cartilage.

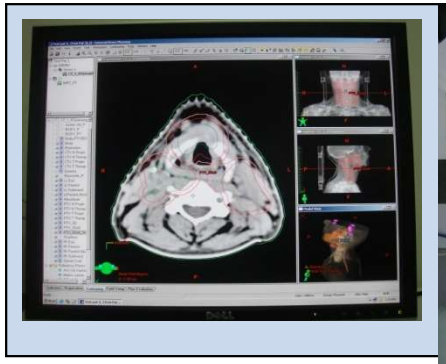
Dental prophylaxis

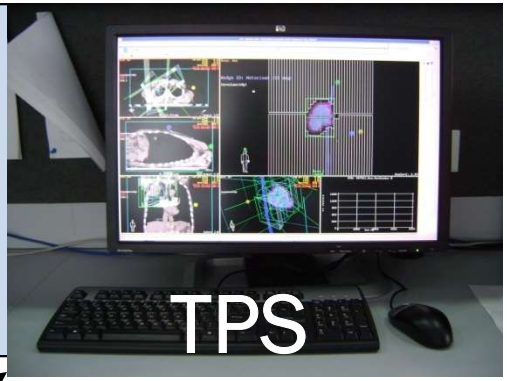
- Evaluation of oral hygiene & dental status mandatory.
- OPG as and when required.
- Teeth with deep caries & poor peridontal support must be removed & healing allowed .
- Prosthesis including lead shielding should be made for brachytherapy of lips, mobile tongue, floor of mouth, to reduce dose to mandible and prevent osteoradionecrosis.

Steps of RT planning

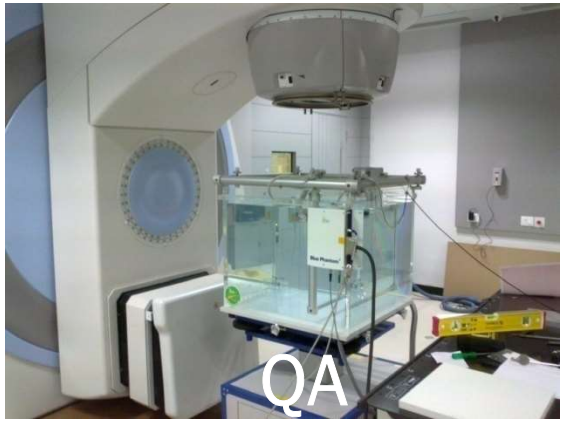
- Immobilization
- Planning CT scan
- Contouring of volumes
- Treatment planning
- Plan implementation
- Treatment execution

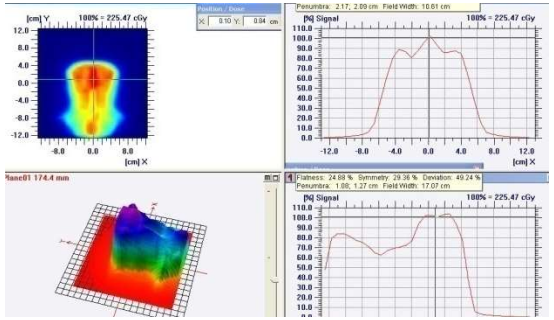
Workflow





Unified Database

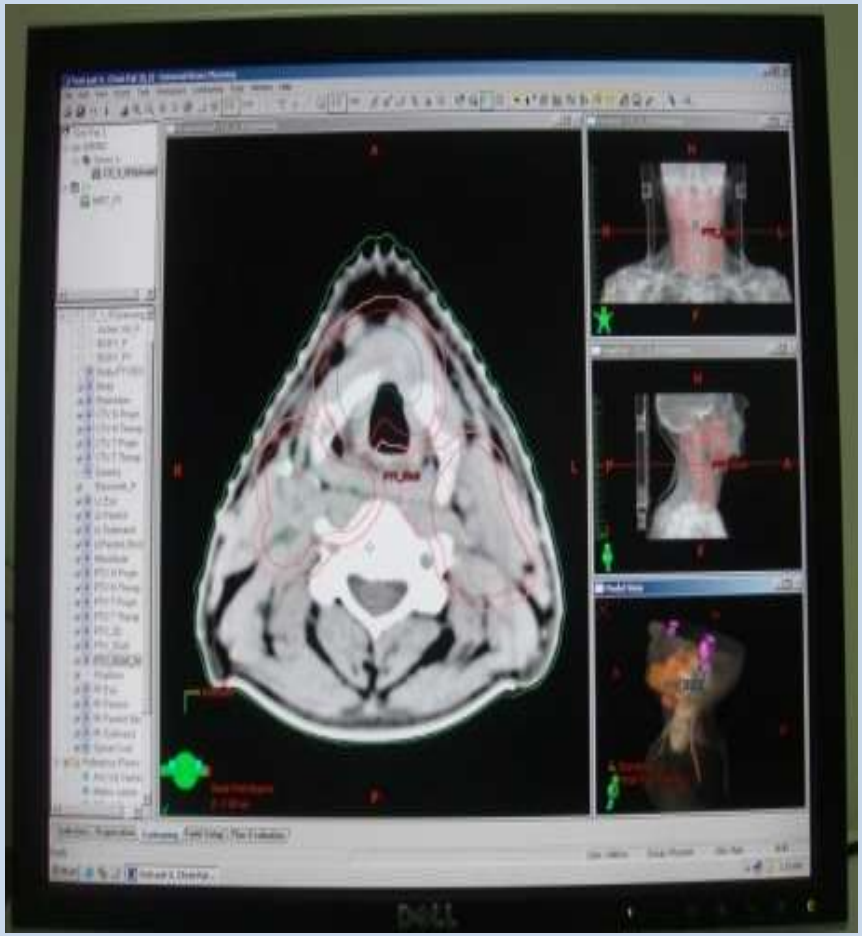


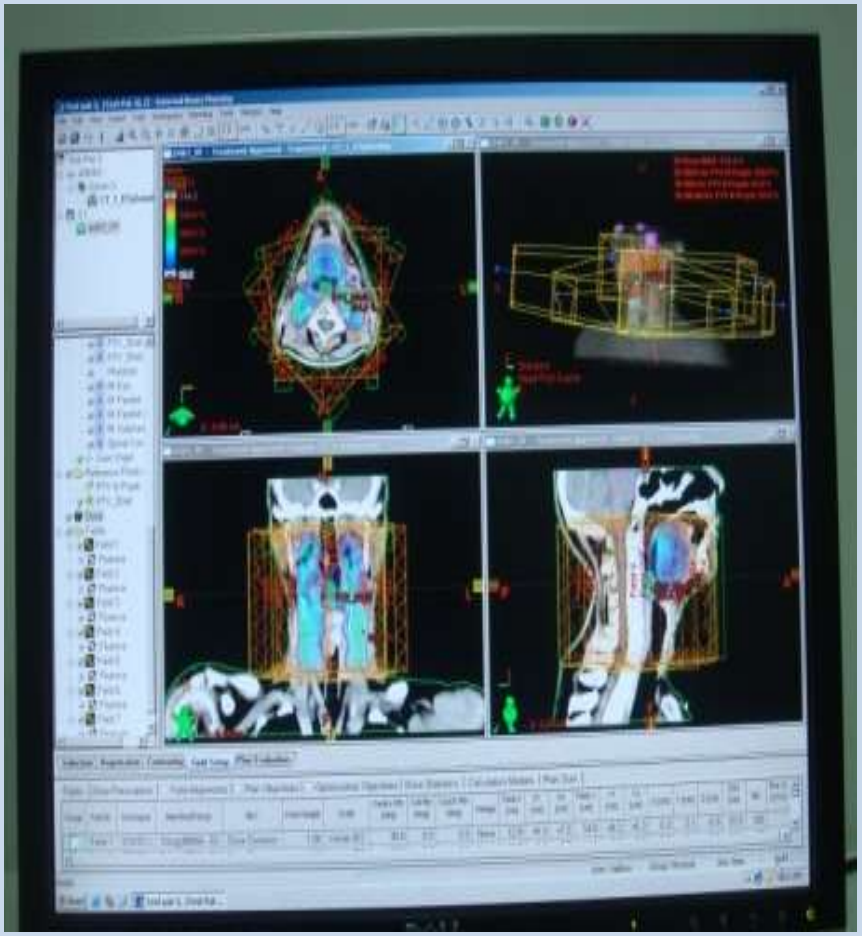


Immobilization

Simulation for EBRT

Contouring & Planning



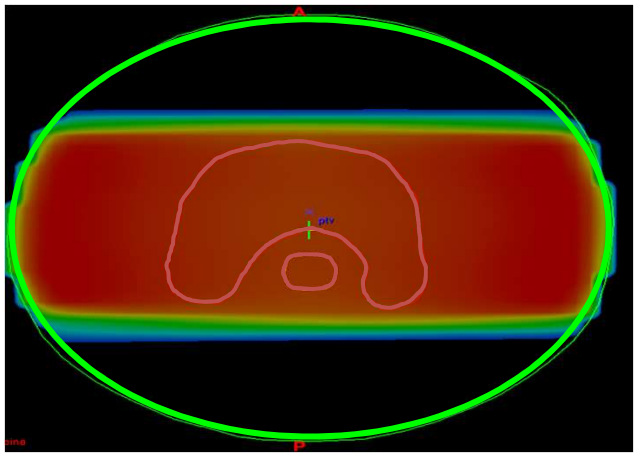


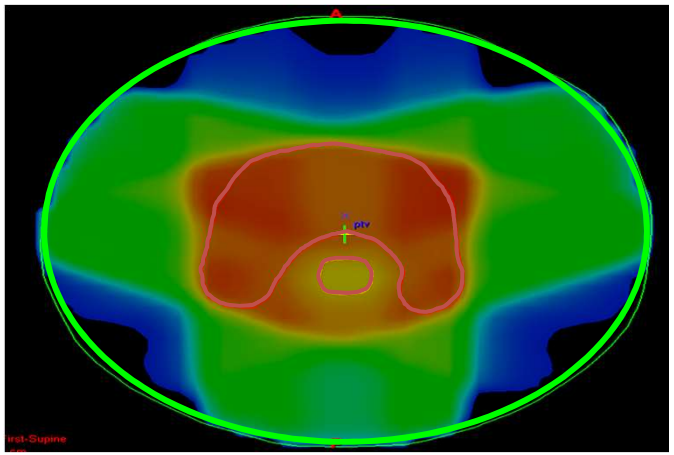
Treatment

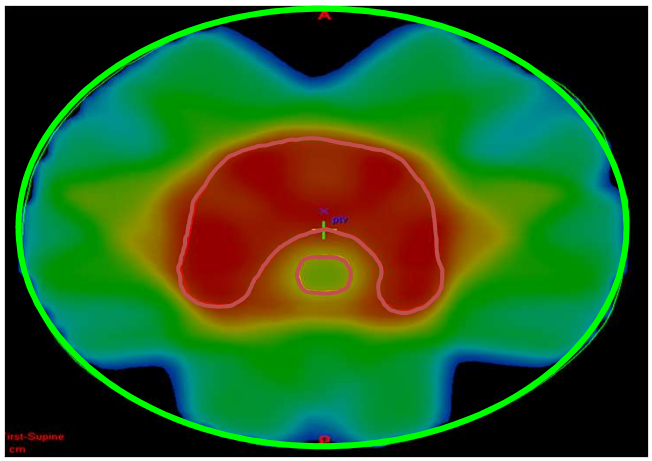
Toxicities

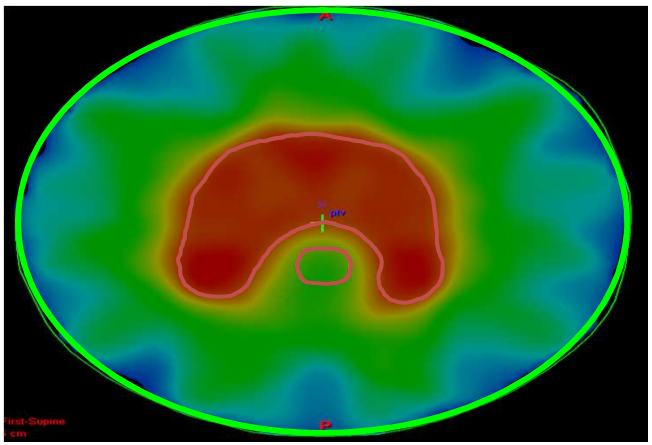
- Mucositis
- Odynophagia
- Dysphagia
- Xerostomia
- Taste alteration
- Dermatitis
- Hematological toxicities
- Ototoxicity

The Search for Conformality









- Modern radiotherapy techniques enable us to better spare the normal tissues

- Complete recovery from post-RT xerostomia is possible if parotid gland doses are kept below 25Gy (if both glands are spared) or 20Gy (if only one can be spared)

- Trials show that in pharyngeal cancers, parotid-sparing IMRT is superior to conventional RT in terms of toxicity, especially xerostomia

Parotid-sparing intensity modulated versus conventional radiotherapy in head and neck cancer (PARSPORT): a phase 3 multicentre randomised controlled trial

Christopher M Nutting[a,b,*], James P Morden[b], Kevin J Harrington[a,b], Teresa Guerrero Urbano[c], Shreerang A Bhide[a], Catharine Clark[d], Elizabeth A Miles[e], Aisha B Miah[a], Kate Newbold[a], MaryAnne Tanay[a], Fawzi Adab[f], Sarah J Jefferies[g], Christopher Scrase[h], Beng K Yap[i], Roger P A'Hern[b], Mark A Sydenham[b], Marie Emson[b], Emma Hall[b], and on behalf of the PARSPORT trial management group[†]

- For oral cancers, the jury is still out:
- RT usually given post-operatively→ lower dose required
- Oral cavity itself is the target→ salivary glands inevitably receive some dose
- Most lesions can be treated by unilateral RT→ at least one parotid gland is spared quite easily

Take Home Messages

- Oral cavity cancers are very common in India
- Many are caused by addiction to khaini, zarda,etc
- Many are first identified by dental surgeons

- Most oral cancers are treated by primary surgery
- Some may require post-op RT
- Medically inoperable patients can be treated by curative RT
- Dental prophylaxis is of invaluable help in the pre-RT preparation

Thank you