

# Radiologic assessment of mandibular invasion in oral cavity squamous cell carcinoma

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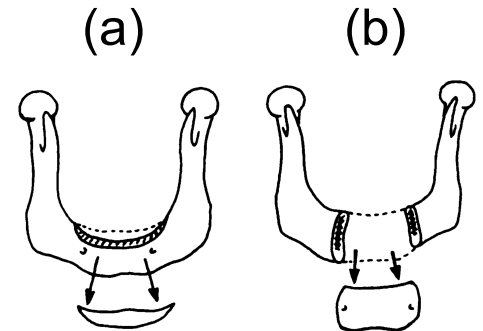
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# Introduction

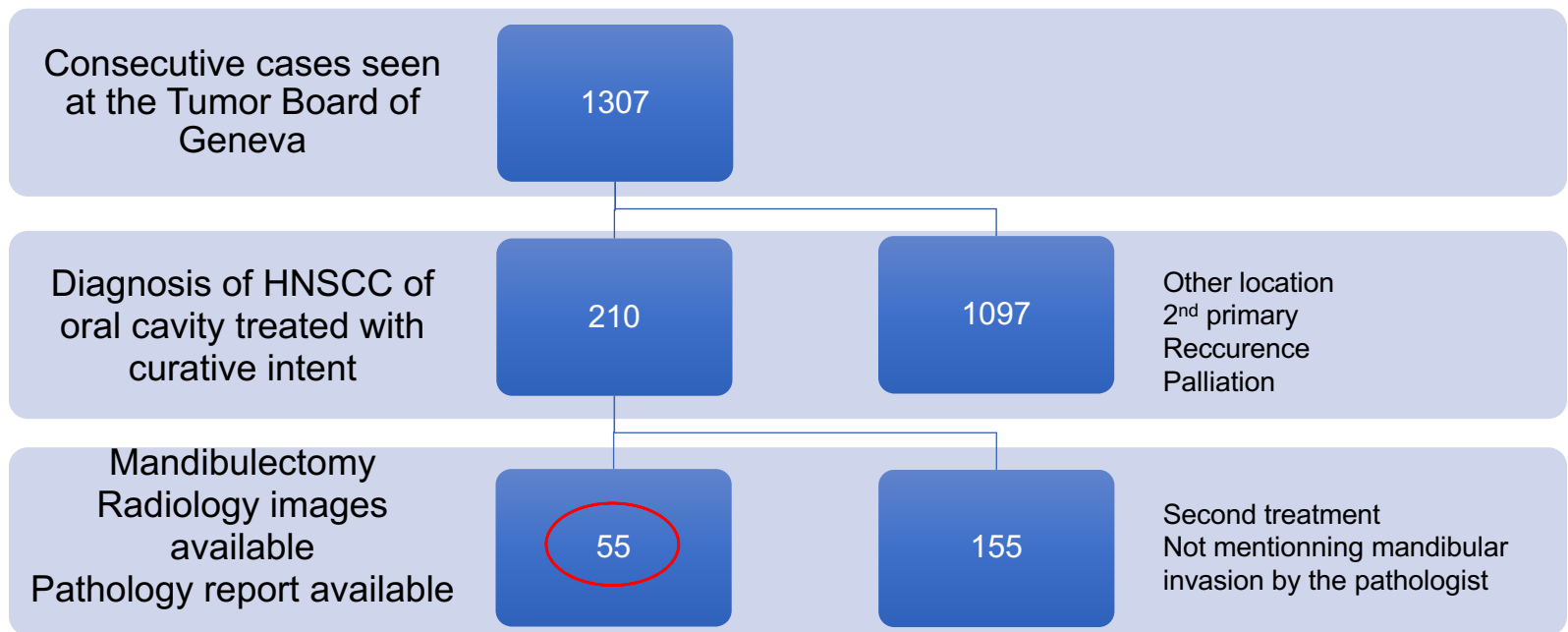
- The rate of mandibular invasion in oral cavity cancer is between 12-56%.
- Tumor-free margins, whatever the resection, is prognostic of survival
- Morbidity is highly influenced by the type of resection: rim (a) vs segmental (b)
- 3 important parameters in surgical planning:
  - Mandibular invasion?
  - Size of tumor-bone contact
  - Residual mandibular height



# Aim of the study

- Primary outcome
  - To evaluate the diagnostic performance of pre-treatment imaging in the assessment of mandibular invasion to histology

# Materials and Methods



# Materials and Methods

- Patients are grouped according to the histologic degree of mandibular invasion

- Absent

H<sub>0</sub>

- Periosteal or contact if periost not seen

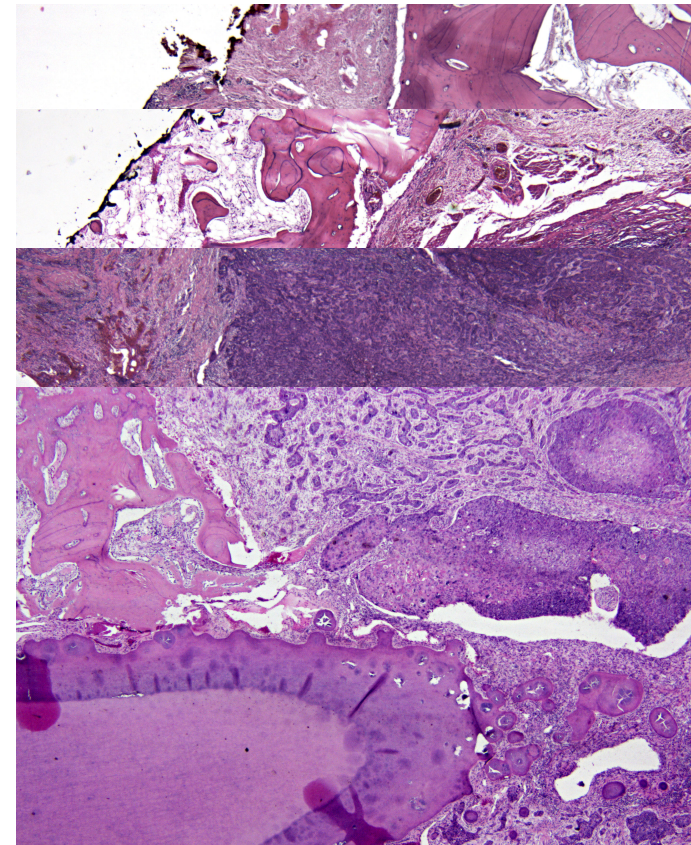
H<sub>1</sub>

- Cortical or alveolar invasion

H<sub>2</sub>

- Medullar invasion

H<sub>3</sub>



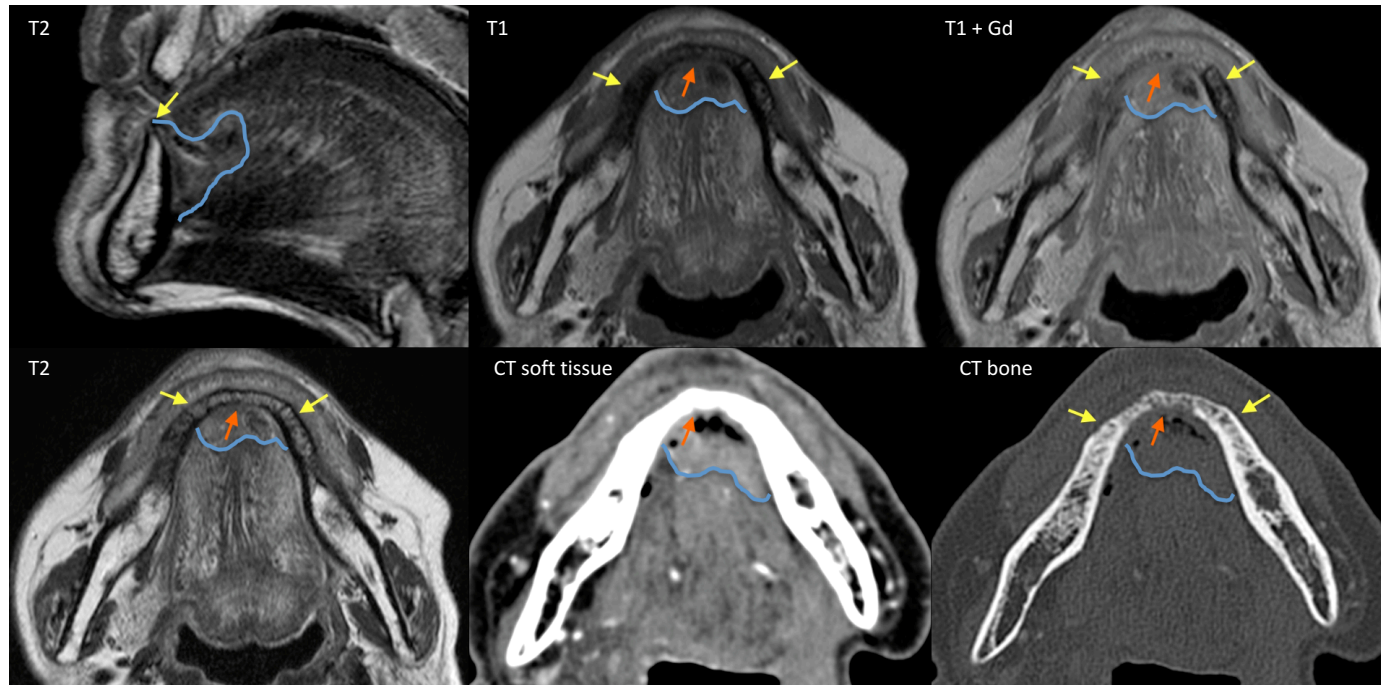
# Materials and Methods

- CT and/or MRI of 55 subjects with mandibular resection are reviewed by seniors radiologist for classic criteria of mandibular invasion<sup>4</sup>
- Classified by probability of mandibular invasion for each modality:
  - 1) definitely no invasion
  - 2) probably no invasion
  - 3) indeterminate/suspicious
  - 4) probably invasion
  - 5) definitely invasion

# Materials and Methods

- CT evaluation criteria
  - Remodeling cortical
  - Cortex erosion
  - Sclerosis medullary cavity
  - Osteolysis
  - Periosteal reaction
  - Perineural spread
- MRI evaluation criteria
  - T2 and STIR
  - T1, T1 + Gd
  - Apparent diffusion coefficient tumor
  - Apparent diffusion coefficient mandible
  - Perineural spread
  - Cortical erosion

# Example of radiologic criteria



- SCC anterior floor of the mouth (blue borders) with ulceration. Edentulous mandible.
  - Cortical erosions: orange arrows.
  - Marrow edema: yellow arrows on MRI.
  - Sclerosis of marrow: yellow arrows on CT.



# Materials and Methods

- Radiologic findings were compared to histology for mandibular invasion irrespective of histologic degree

# Results: cohort characteristics

n=55				
	H <sub>0</sub> n=21	H <sub>1</sub> n=5	H <sub>2</sub> n=7	H <sub>3</sub> n=22
CT	19	5	7	15
MRI	17	5	7	19
CT and or MRI	21	5	7	22
CT and MRI	15	5	7	11
RIM	19	2	5	6
SEGMENTAL	2	3	2	16

# Results: Detection of mandibular invasion irrespective of histologic degree

n=55				
H <sub>0</sub> =negative group H <sub>1</sub> H <sub>2</sub> H <sub>3</sub> = positive groups	CT n=46	IRM n=48	CT and/or IRM n=55	CT and IRM n=39
Prevalence of mandibular invasion	58.7%	64.6%	61.8%	61.5%
True Positive, n, (%)	24	27	31	22
True Negative, n, (%)	12	10	13	8
False Positive, n, (%)	7	7	8	7
False Negative, n, (%)	3	4	3	2
Sensitivity (CI 95%)	88.9% (71.9-96.2)	87.1% (71.1-94.9)	91.2 % (77.0-97.0)	91.7 % (74.2 -97.7)
Specificity (CI 95%)	63.2% (41.0-80.9)	58.8% (36.0-78.4)	61.9% (40.9-79.2)	53.3% ( 30.1-75.2)
Negative predictive value	80%	71.4%	81.2%	80.0%

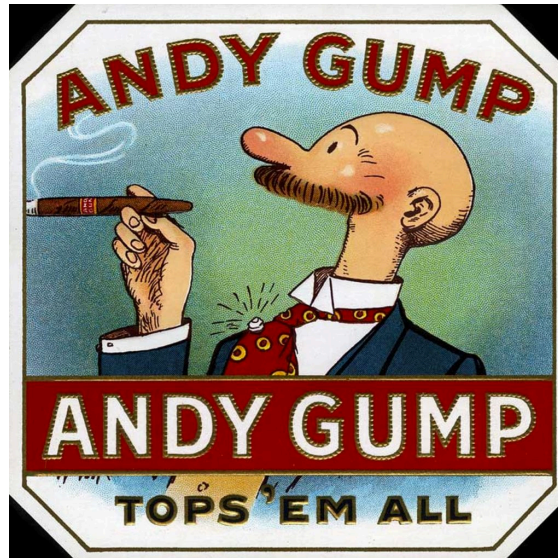
# Discussion

- 3/55 False Negative on CT are caused by limited mandibular invasion (cortical symphysis invasion (2/55) and cortical 2mm invasion of the angle of mandible (1/55))
- We have high prevalence of mandibular invasion due to design of the study
- On pathologic analysis, all False Positive are caused by tumor in immediate vicinity ( $<1\text{mm}$ ) from mandibular periost/tooth alveole

# Conclusion

- Good sensitivity (87.1% - 91.5%)
  - Cave: insertion of muscles
- Poor overall specificity (53-65%) due to:
  - case selection (clinically immediate tumor vicinity to mandible)
  - inflammatory findings due to periodontal disease & tooth extraction
- Moderate negative predictive value

# Merci pour votre attention



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