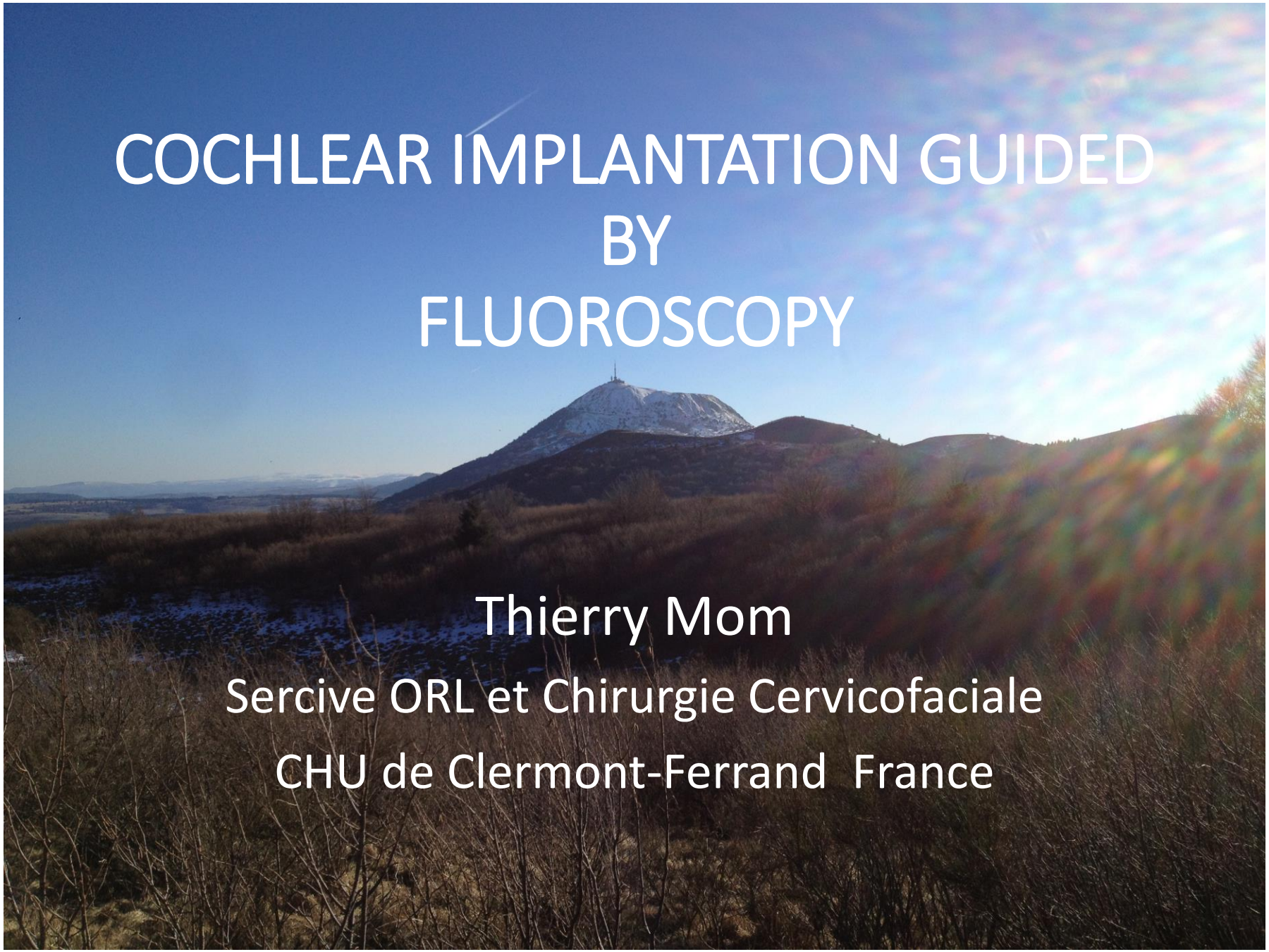

COCHLEAR IMPLANTATION GUIDED BY FLUOROSCOPY

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Questions about the EA -insertion

- The EA-insertion is a blind procedure which relies on the surgeon experience and the feed-back of resistance to insertion he can feel. BUT it is well-known that some mishappens can occur:
  - basal King
  - tip fold-over
  - Unexpected vestibular insertion
- When hearing preservation is attempted, teh exact angle of insertion is of utmost importance : 360° ~ 1 kHz (Stakhovskaya et al 2007). Currently it is only possible to predict the angle of insertion, based on Escudé calculation adpated to the size of the cochlea.

Questions about the EA -insertion

- Some teams can propose intra-operative control of the EA positioning, but always after it has been inserted.
  - Irreversible cochlear damage can have already be done
  - The angle of insertion could be wrong and too high with hearing damage as a consequence
- In order to preclude these bad issues: FLUOROSCOPY

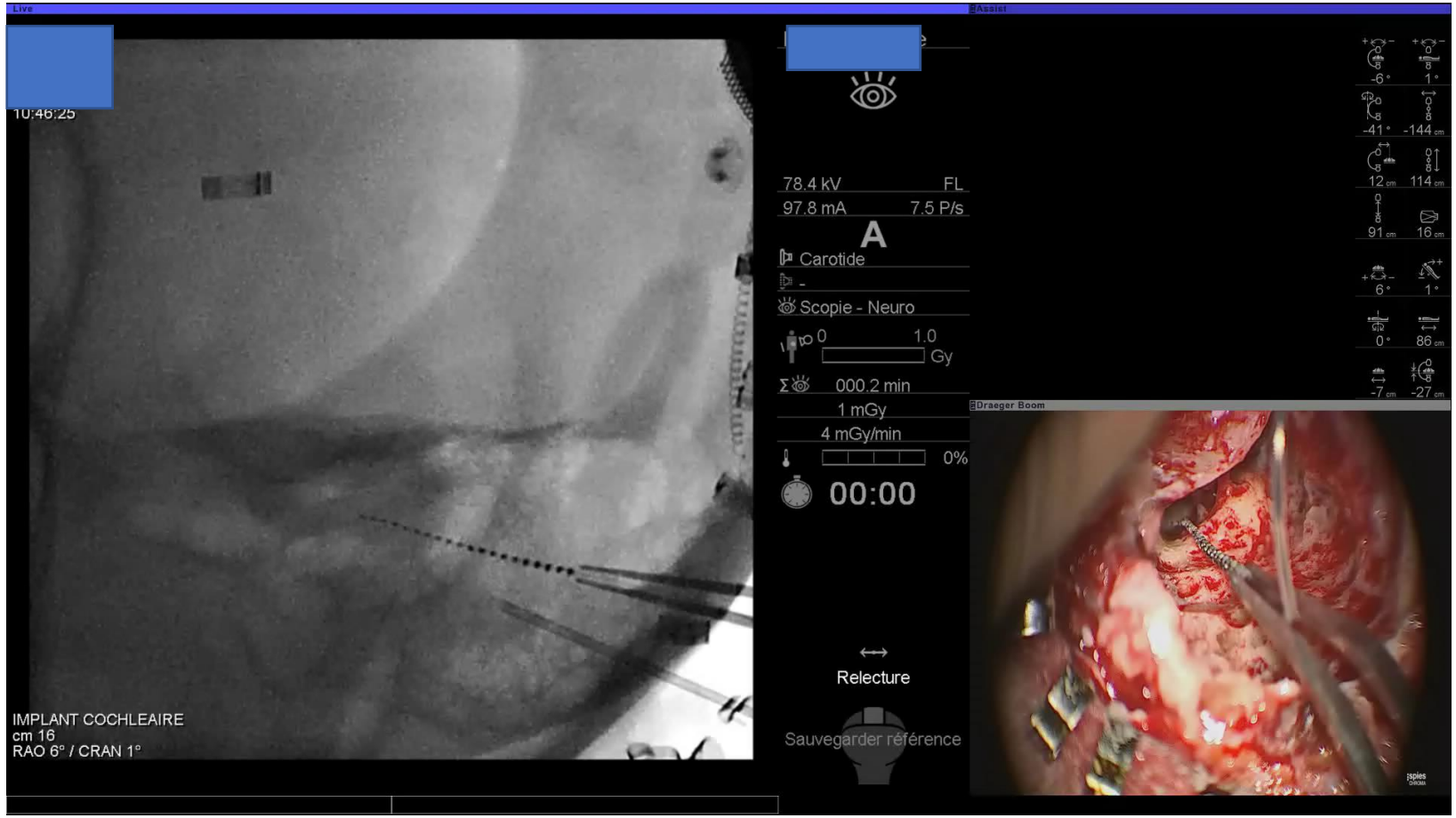
Materials

- Zeego Siemens: computerized radioscopy with a robotized C - arm, in an imaging room fully equiped with high tech materials
- A real OR in the department of interventional radiology
- very low X-ray delivery:
  - Total time of scopy : 4.7 min (297 µGy.cm2)
  - Total exposition with cone-beam acquisition at the end of surgery : 6.073 µGy.cm2
    - 4 DSA (digital subtract radiography)
    - 1 cone beam CT (5.679 µGy.cm2)

« IMABLOC »

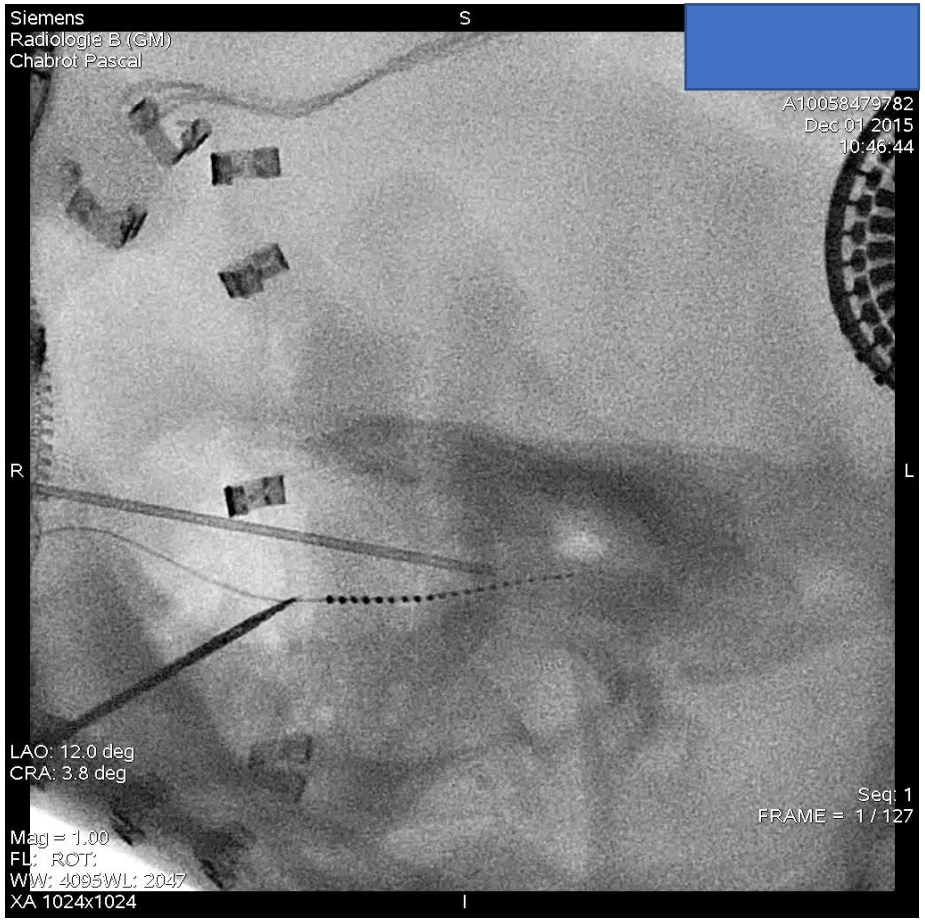
The C-arm: it allows intraoperative real-time fluoroscopy and postoperative cone beam

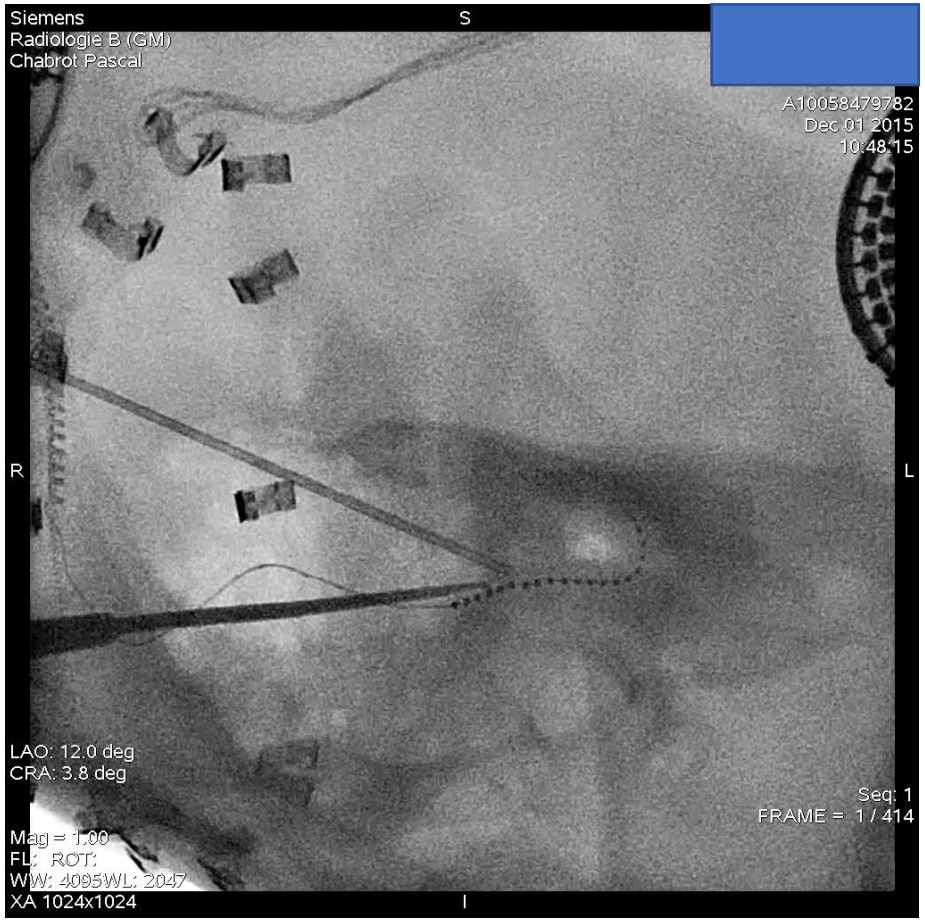
Cochlear implantation guided by fluoroscopie



Far -advanced otosclerosis

Insertion with a straight EA (Oticon Medical)

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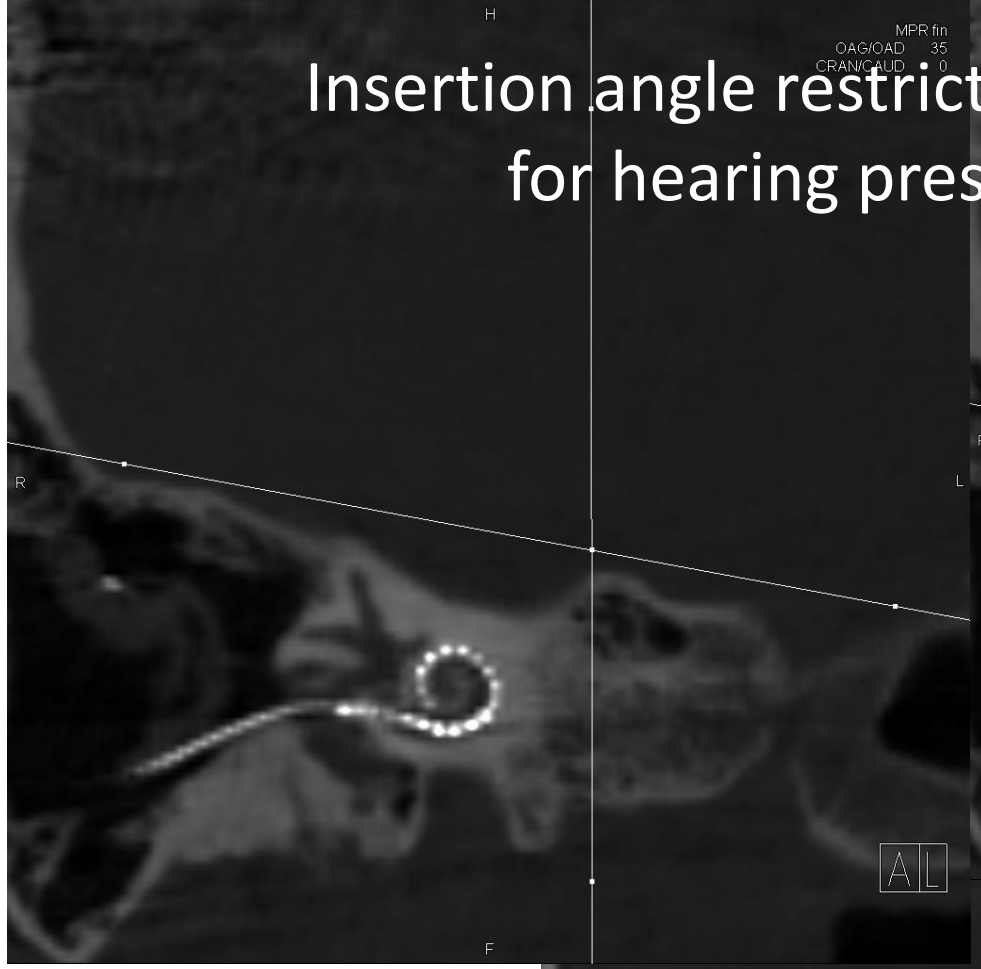
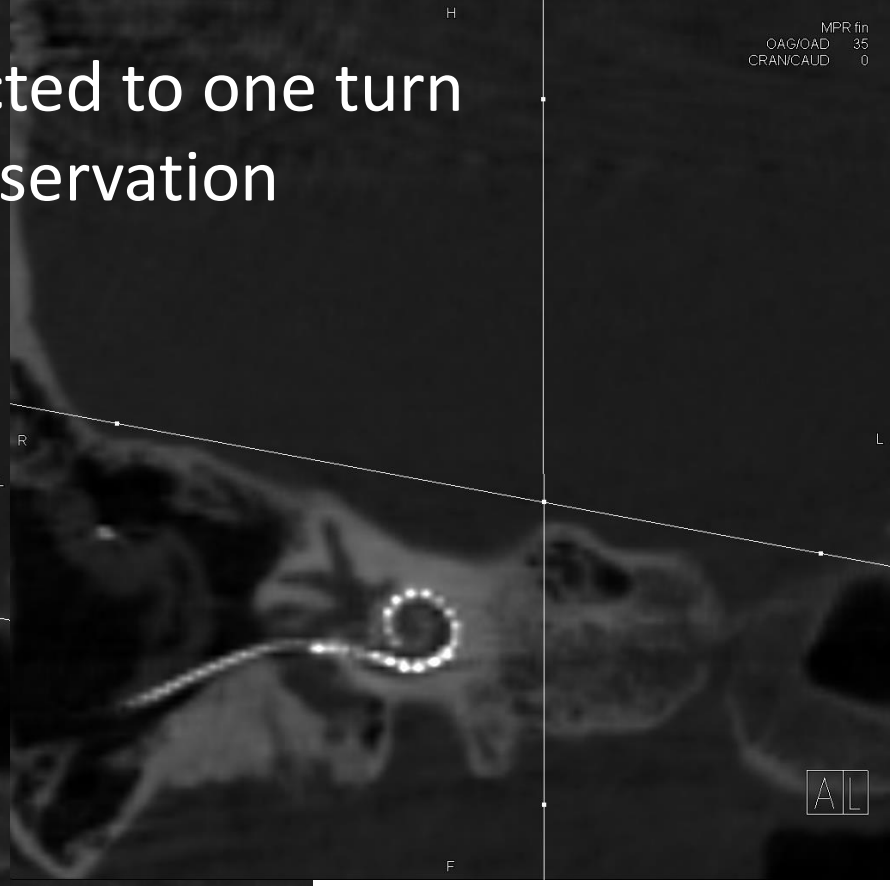
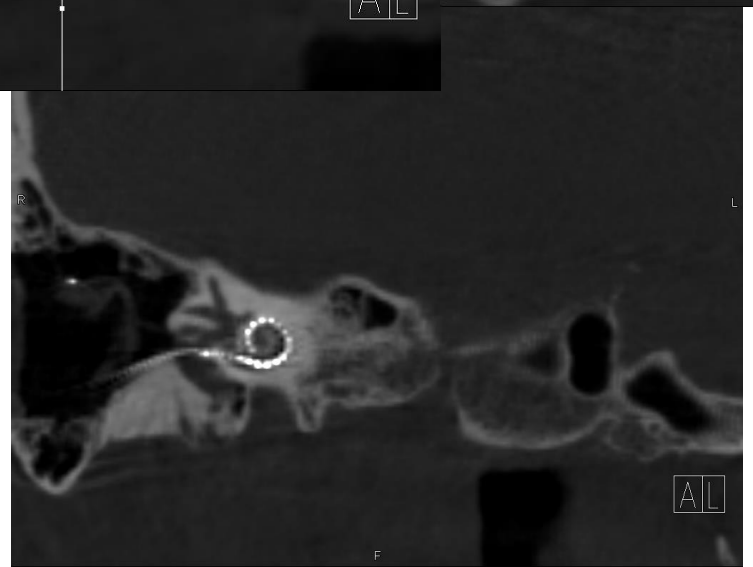
Insertion angle restricted to one turn for hearing preservation







RESULTS

- from November 2015 to April 2018 :
  - 32 patients (34 CIs ; 20 F ; 60+/-22 ans ; 2 children)
  - 14 « Hearing preservation »
  - 11 « occasional »
  - 9 « anatomical consideration »
- « Hearing preservation »: approx. 20 dB of hearing loss to be refined. Amélioration de la technique d'insertion: smooth/rough
- « anatomical consideration »: very useful in all cases
- « Occasional »: 3 (27%) cases useful (vestibular misrouting, EA stuck,unexpected electrodes out in revision surgery)

Conclusions

- Very useful advance in cochlear implantation
- It reveals the insertion in a real –time manner!
- Should limit cochlear damages in all cases (smooth insertion)
- Should avoid misrouting, basal kings or tip fold-overs
- Should limit revision surgeries
- With low irradiation
- Indicated for us now in all cases in adults.
- Reserved in children for cases with malformed cochleas
- The only limit is the availibility of the IMABLOC

THANS TO THE TEAMS OF AND OF CLERMONT-FERRAND

- COCHLEAR IMPLANT UNIT
  - Mathilde Puechmaille, Alexane Lere, Christine Vincent, Laurent Gilain
- INTERVENTIONAL RADIOLOGY
  - Chiara Perazzini, Pascal Chabrot, Louis Boyer