How to treat Benign Paroxysmal Positional Vertigo of any canal

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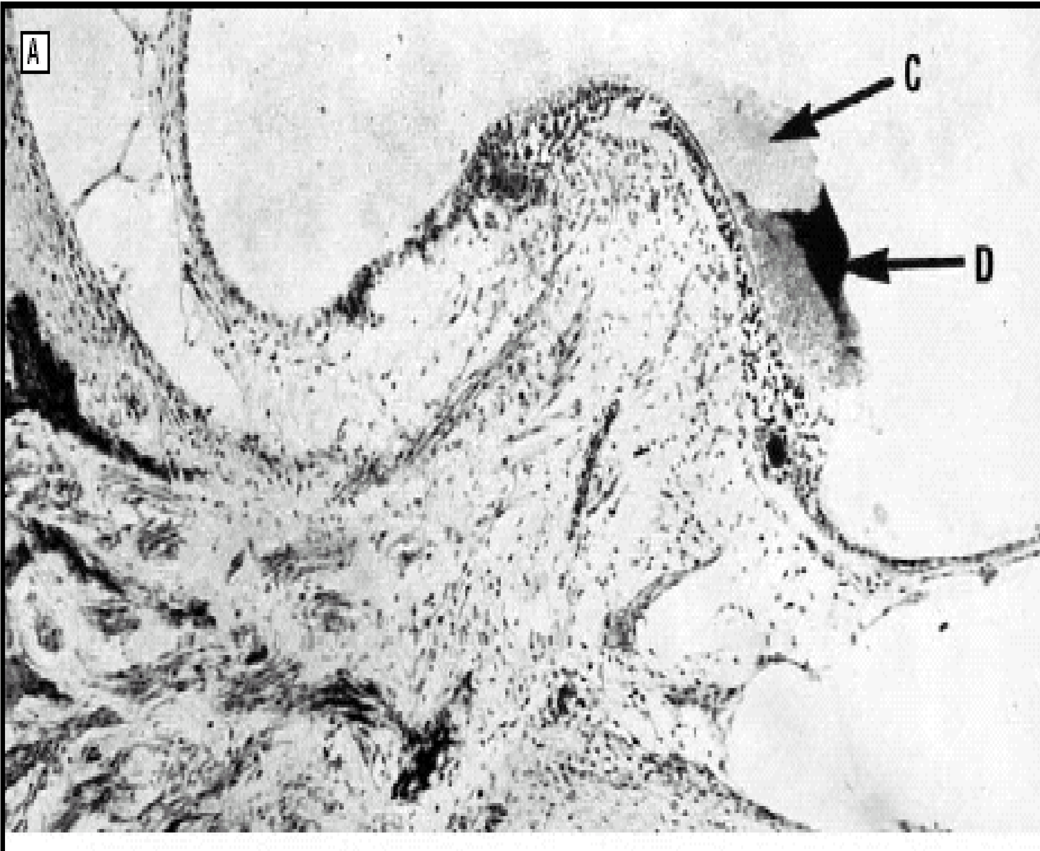
BPPV

- Most frequent vestibular disease
- Most common cause of vertigo in humans
- Lifetime prevalence: 2.4%
- 1 year incidence: 0.6% (von Brevern, 2007)

this means that every year, in a city like Calcutta, there are about 50000 adults suffering from ***BPPV*** *for the first time*

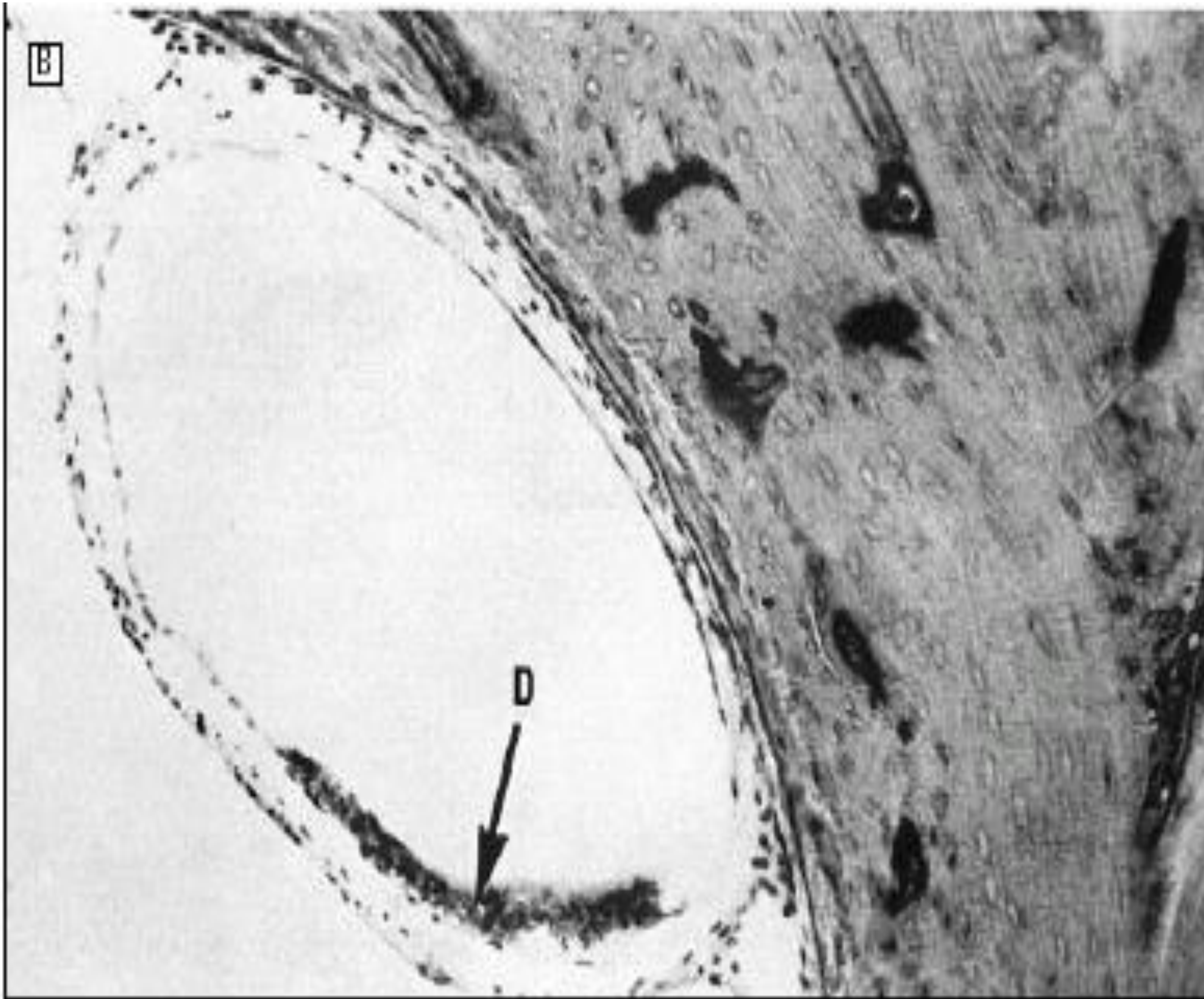
Cupulolithiasis (Schuknecht HF, **1969**)

Histopatologic finding of basophilic deposits (calcium carbonate) in the cupula of the PC of 2 patients with history of BPPV.
Probably otoconia dislodged from the utricular macula



Development of the heavy-cupula concept
PN is generated by a PC-cupula sensitive to gravity

Canalolithiasis (Hall, Ruby and Mc Clure 1979)

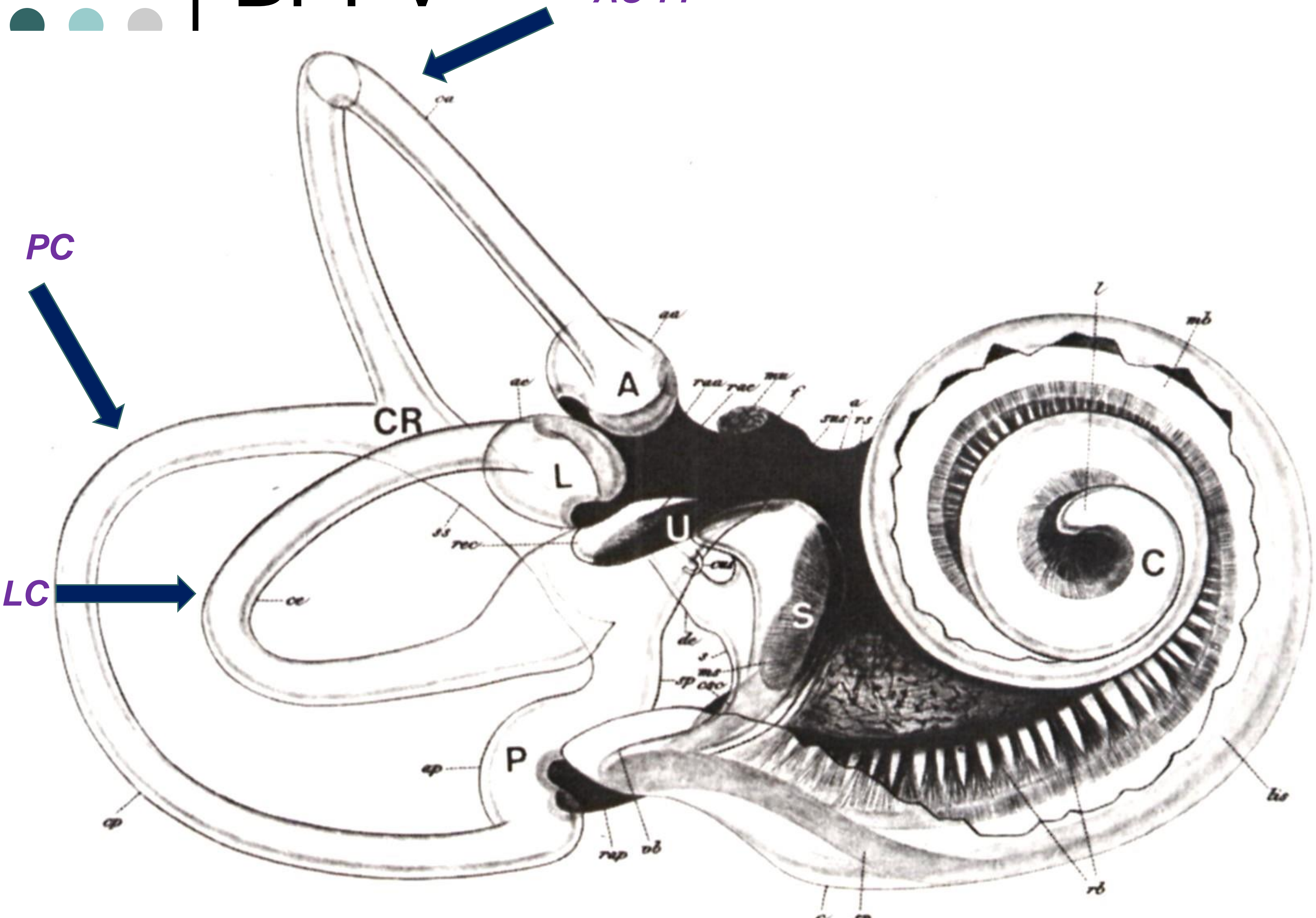


Suggestion that the pathogenetic mechanism is due to something moving inside the endolymph of the canal, rather than adhering to the cupula of the PC

Concept of canalolithiasis supported by the intraoperative observation of abundant free-floating debris in the endolymph of the PC

(Parnes & McClure, 1992)

BPPV



- **Unilateral PC**: *about 75% (>60% right)*
- Bilateral PC: *5-7% (3% post-traumatic)*
- **Lateral Canal**: *15-20%*
  - *geotropic: about 3/4*
  - *apogeotropic: about 1/4*
- **Atypical forms** *(anterior canal??): 3-5%*
- **Multiple canals**: *<2%*

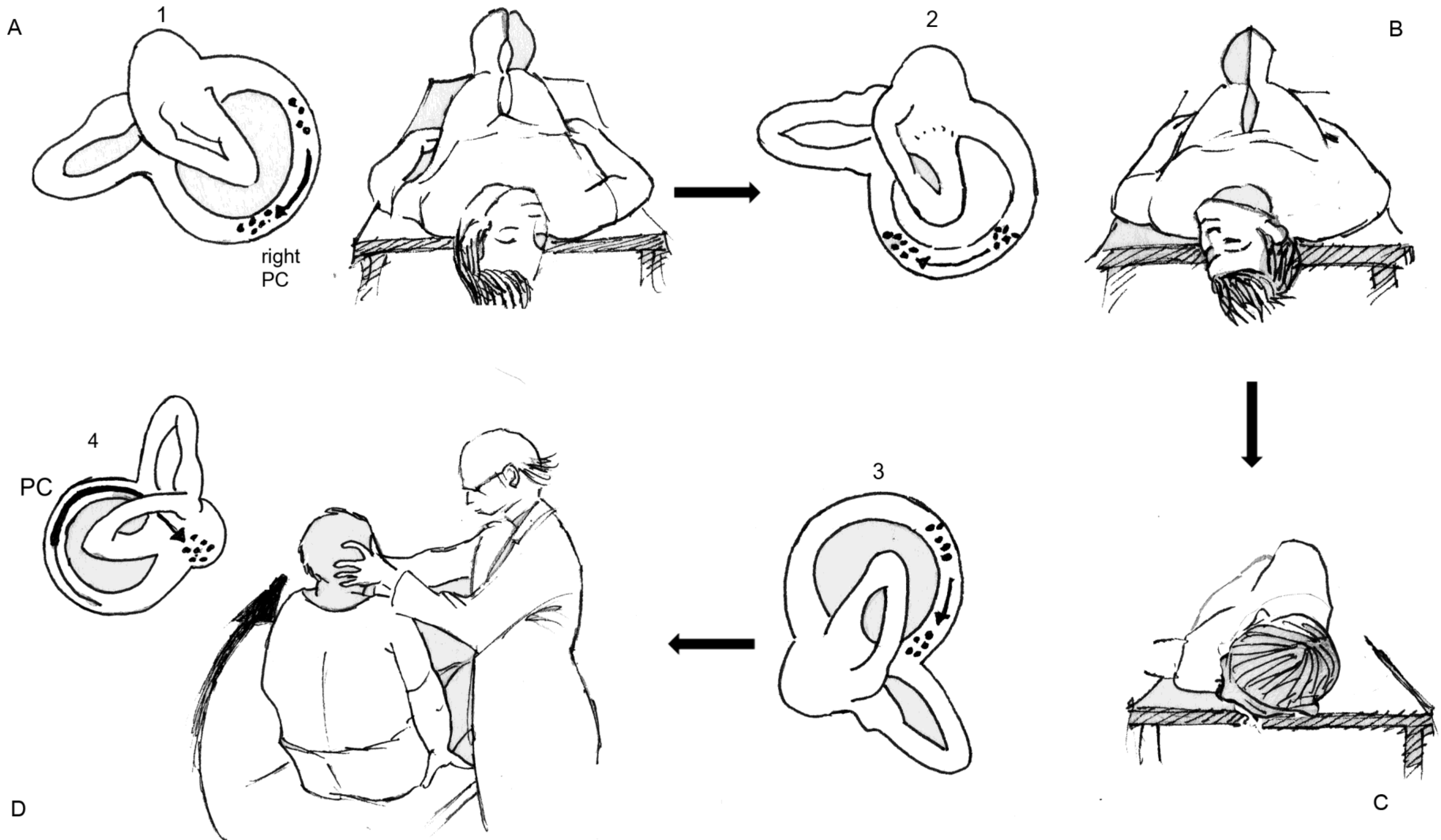
Caruso & Nuti (2005)
Epidemiological data from 2270 PPV patients

Treatment for PC BPPV: *The Canalith Repositioning Procedure (CRP) by John Epley*

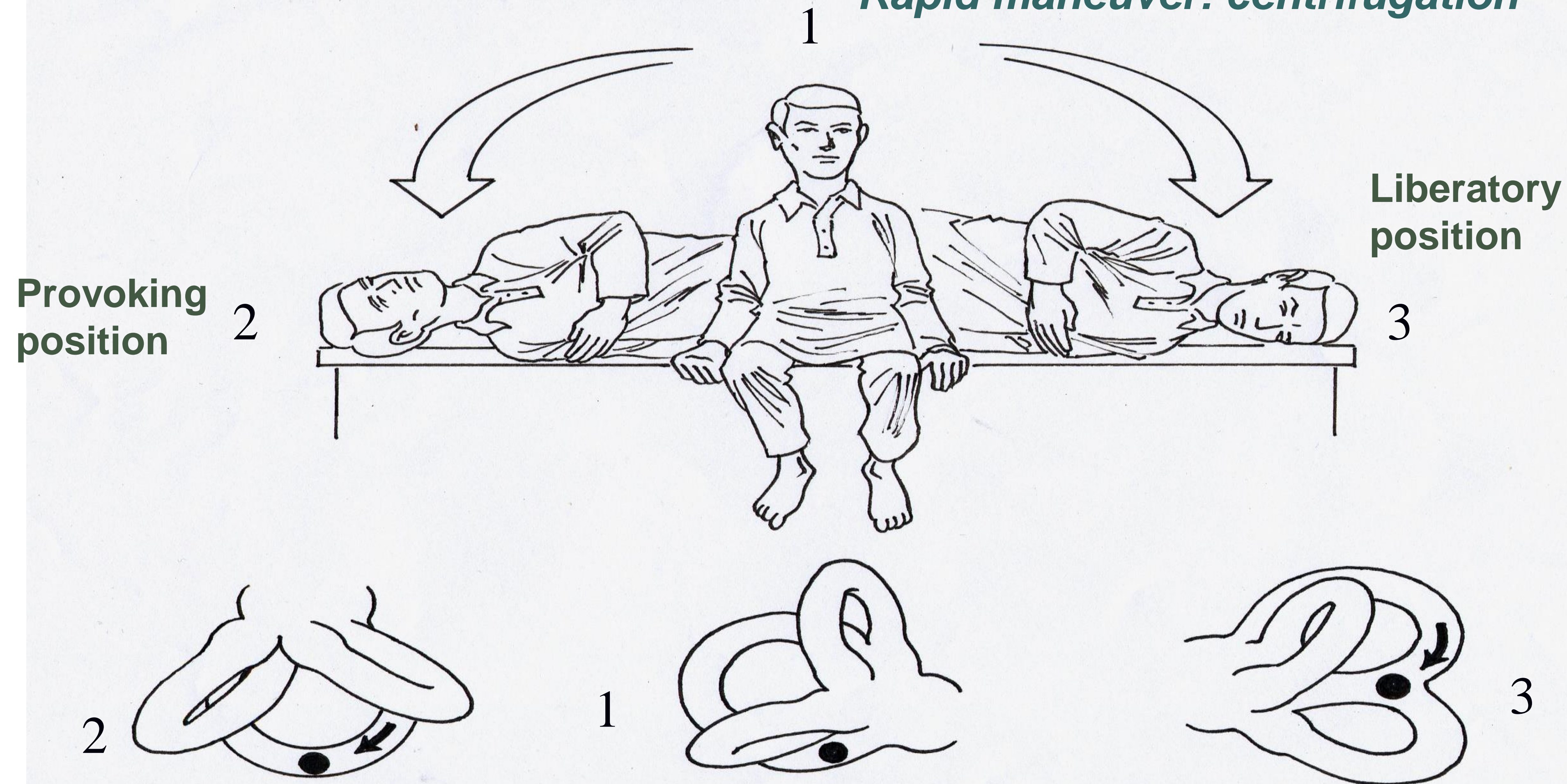
Devised 1979
Published 1992

- Probably the most widely adopted treatment in the world

Designed to allow debris to migrate by *gravity* out of the PC through the common crus



Treatment for PC BPPV: The Sémont liberatory manoeuvre (1983-1988)

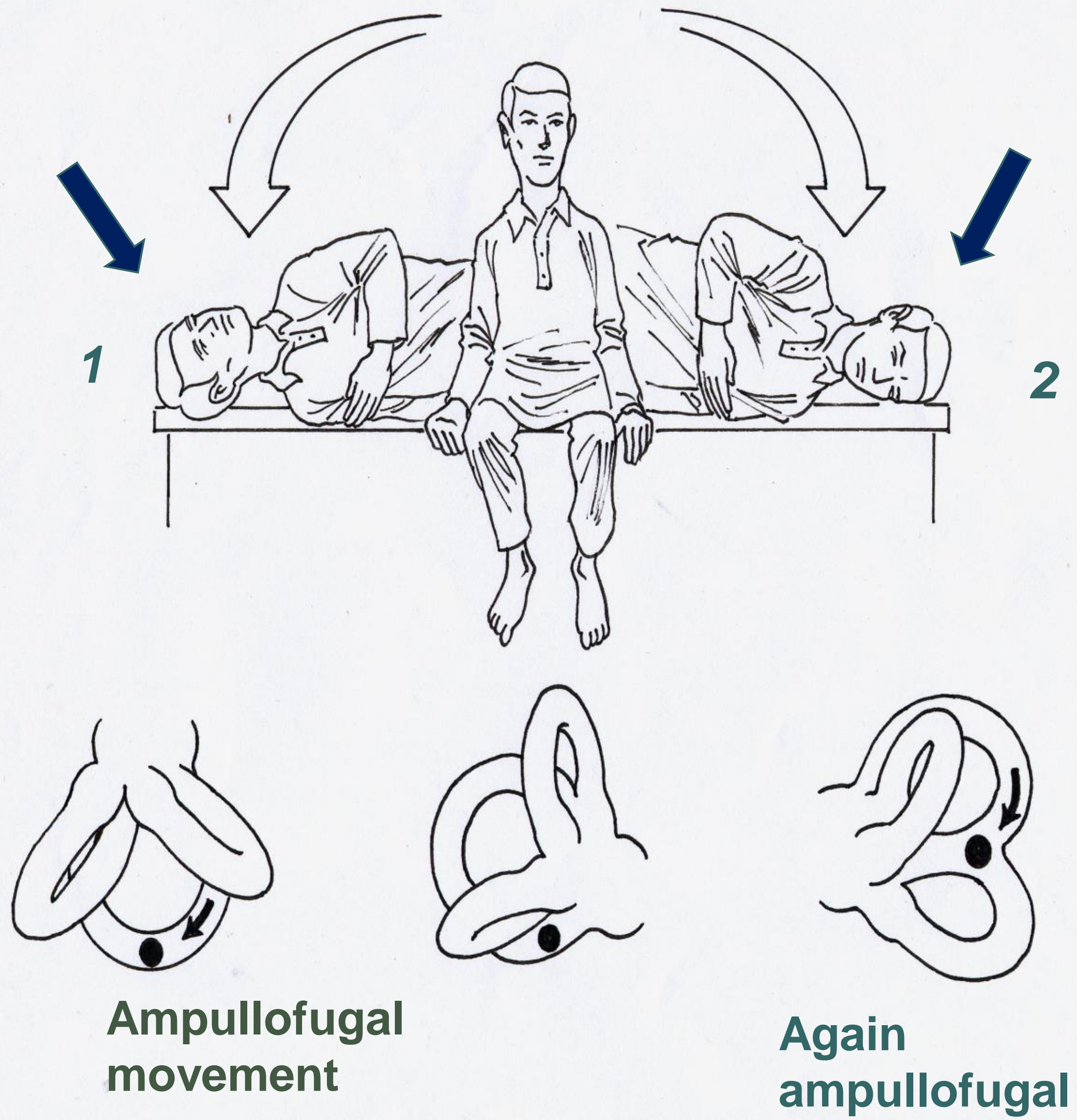


Sémont manoeuvre

- **Provoking position (1)**: episode of vertigo with up-beat PN, rotating towards the pathological ear

- **Liberatory position** *(2):* another episode of vertigo and PN with the ***same*** direction of rotation as in the provoking position (**liberatory nystagmus**)

Liberatory nystagmus is nearly always a good prognostic sign



PC treatment

- Double blind randomized trials on CRP (Lynn et al, 1995; von Brevern et al, 2006) and Sémont maneuver (Mandalà et al, 2012; Chen et al, 2012) allow to consider both treatments as effective and safe therapy that should be offered to patients of all ages
- They belong to the level A of the Classification of Recommendations of the American Academy of Otolaryngology and of Neurology
- Level A: Treatments with established efficacy

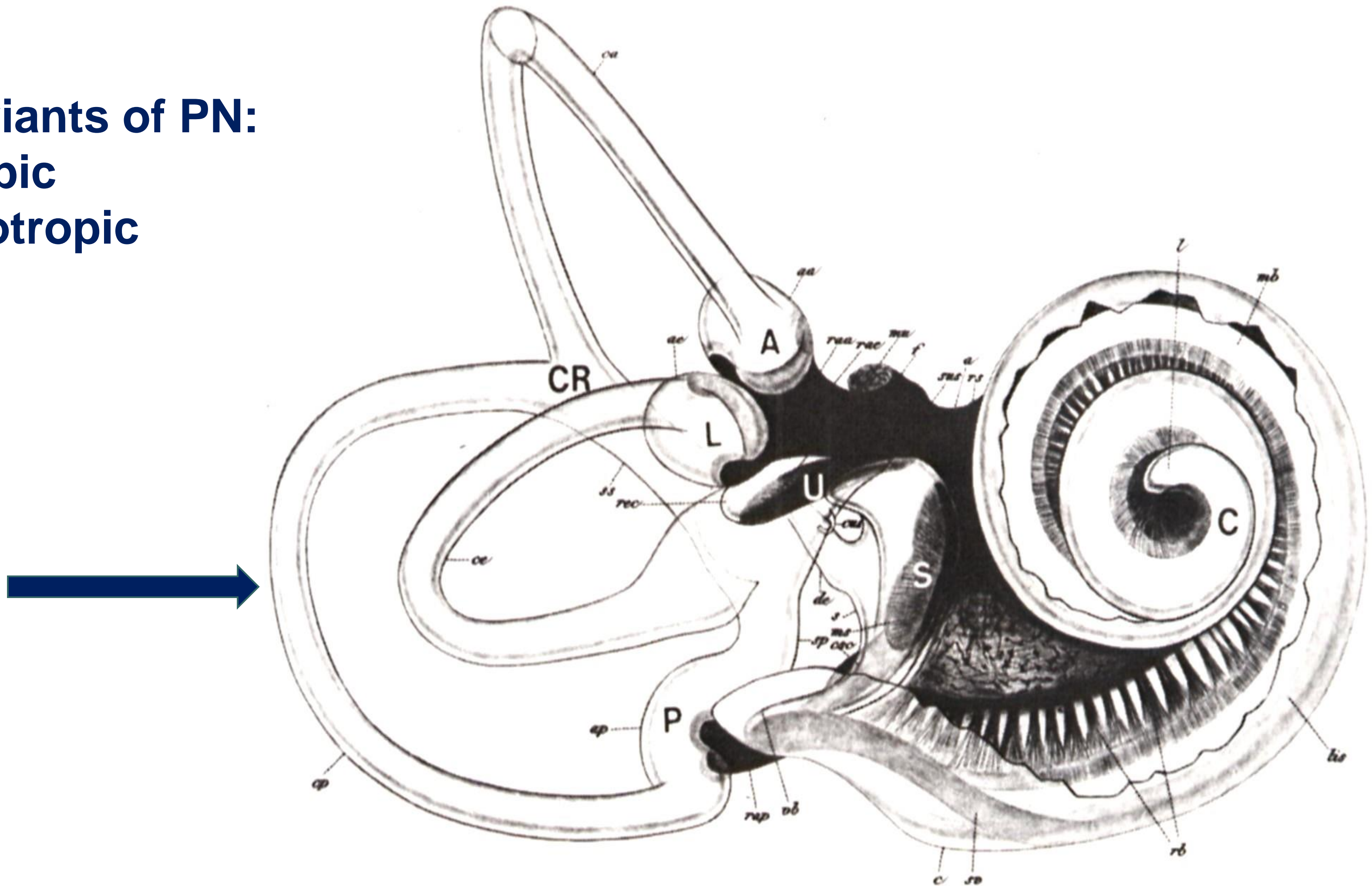
PC treatment

- 70-80% of patients symptom-free with one or two therapeutic session
- 10-15% need more than two sessions
- It is necessary to re-evaluate the patient after 5 ineffective therapeutic attempts
- Around 5%: conversion to LC-BPPV or pDBN

LATERAL (HORIZONTAL) CANAL BPPV

Diagnostic Test: Supine Head Roll test
(Barany position / McClure-Pagnini test)

Two variants of PN:
-geotropic
-apogeotropic

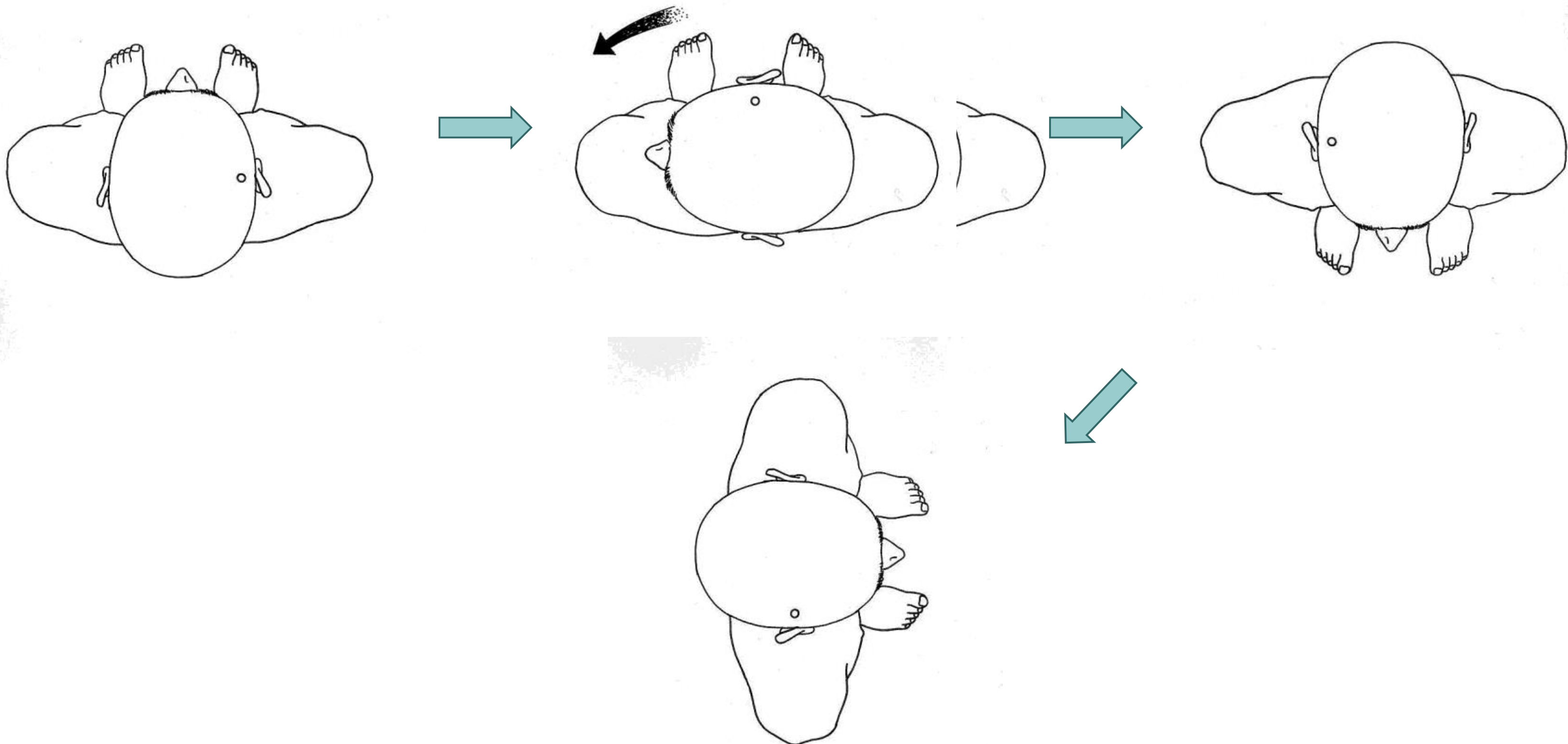


LATERAL CANAL BPPV MANAGEMENT (geotropic)

- Barbecue rotation (Lempert-Tiel Wilck, 1994)
- Forced Prolonged Position (FPP) (Vannucchi et al., 1994)
- Liberatory manoeuvre (Gufoni-Mastrosimone (1999)

Barbecue rotation by Lempert (1994)

Lempert's barbecue maneuver consists of a 270-degree rotation to the healthy side oin a lying patient

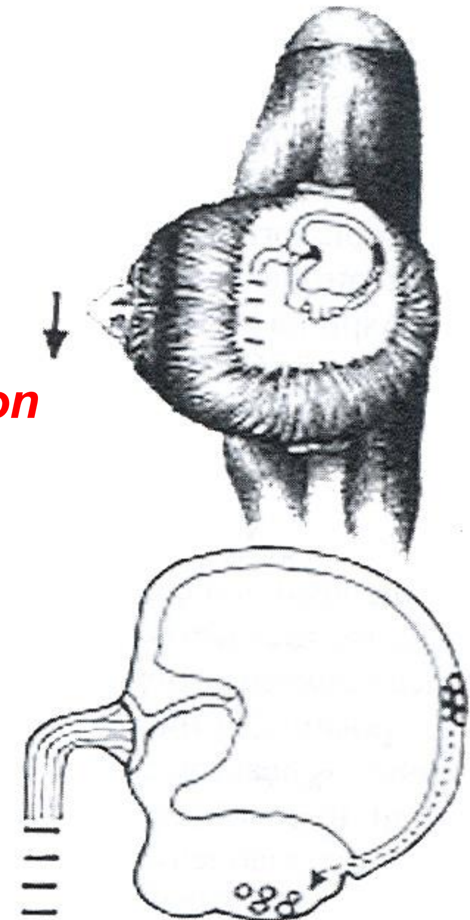


Forced Prolonged Position

Very simple method: patient merely has to lie on the healthy side (**with affected side up**) for as long as possible.

Outcome treatment: 1-2 days later

Exit by gravitation



Barbecue (Lempert)

- 38 patients
- 24 symptom free (63%)
- 4 PC
- 2 apogeotropic

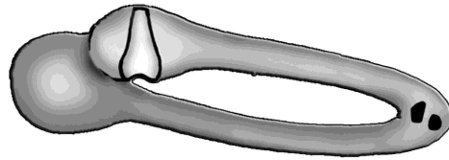
FPP (Vannucchi)

- 56 patients
- 41 symptom free **(73%)**
- 2 PC

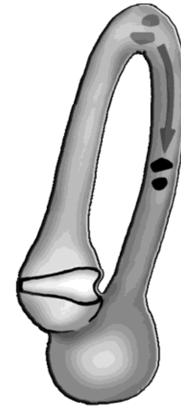
Nuti D. et al. The management of horizontal-canal paroxysmal positional vertigo. Acta Otolaryngol. (Stockh.), 1998 ***118: 445–460***

Gufoni's maneuver for left LC BPPV (geotropic)

A

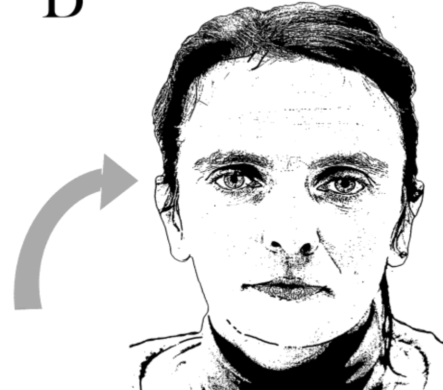


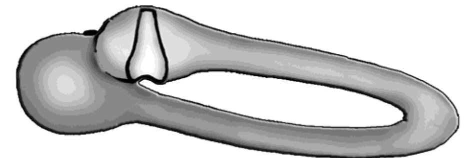
B



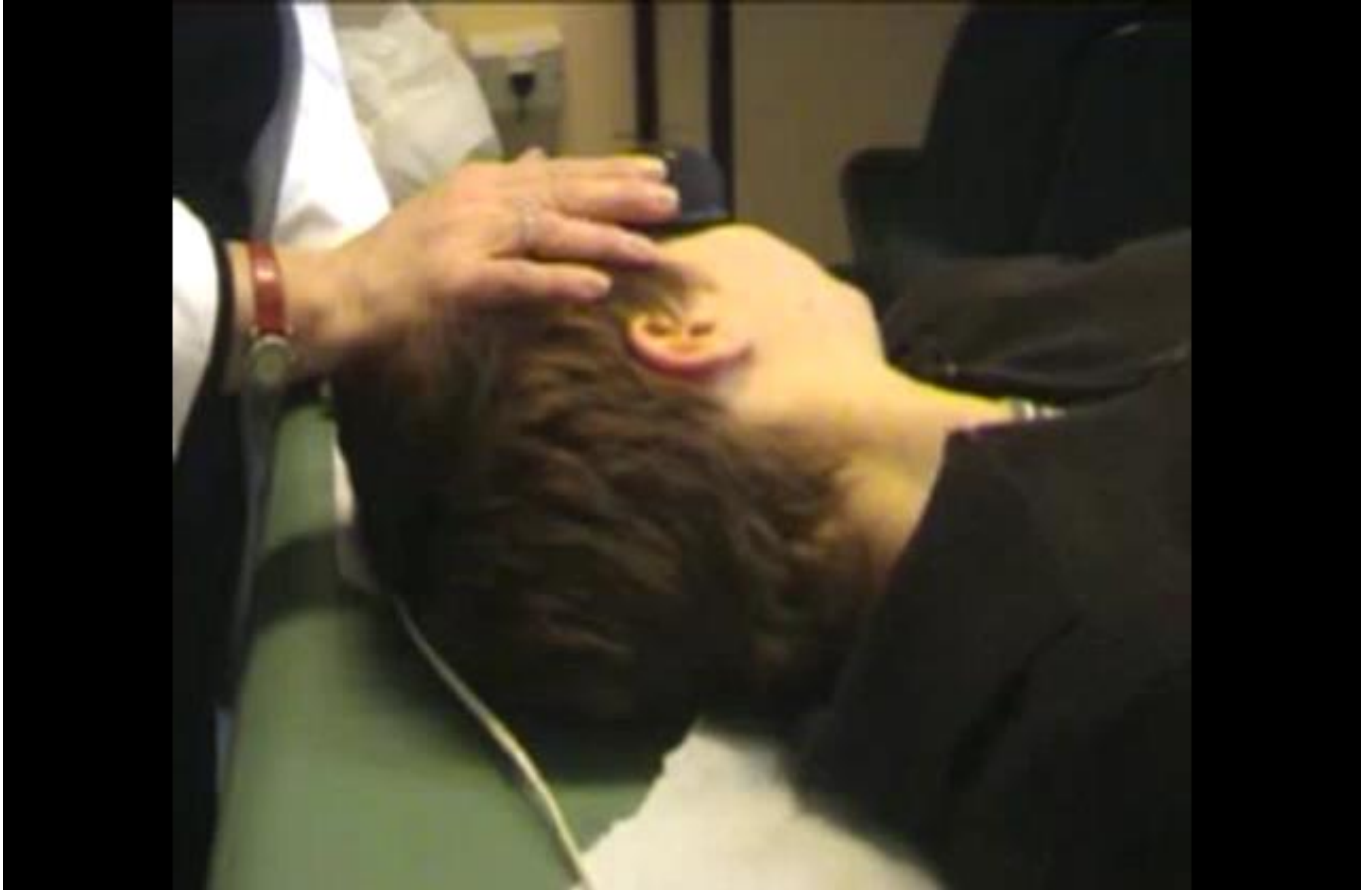
C

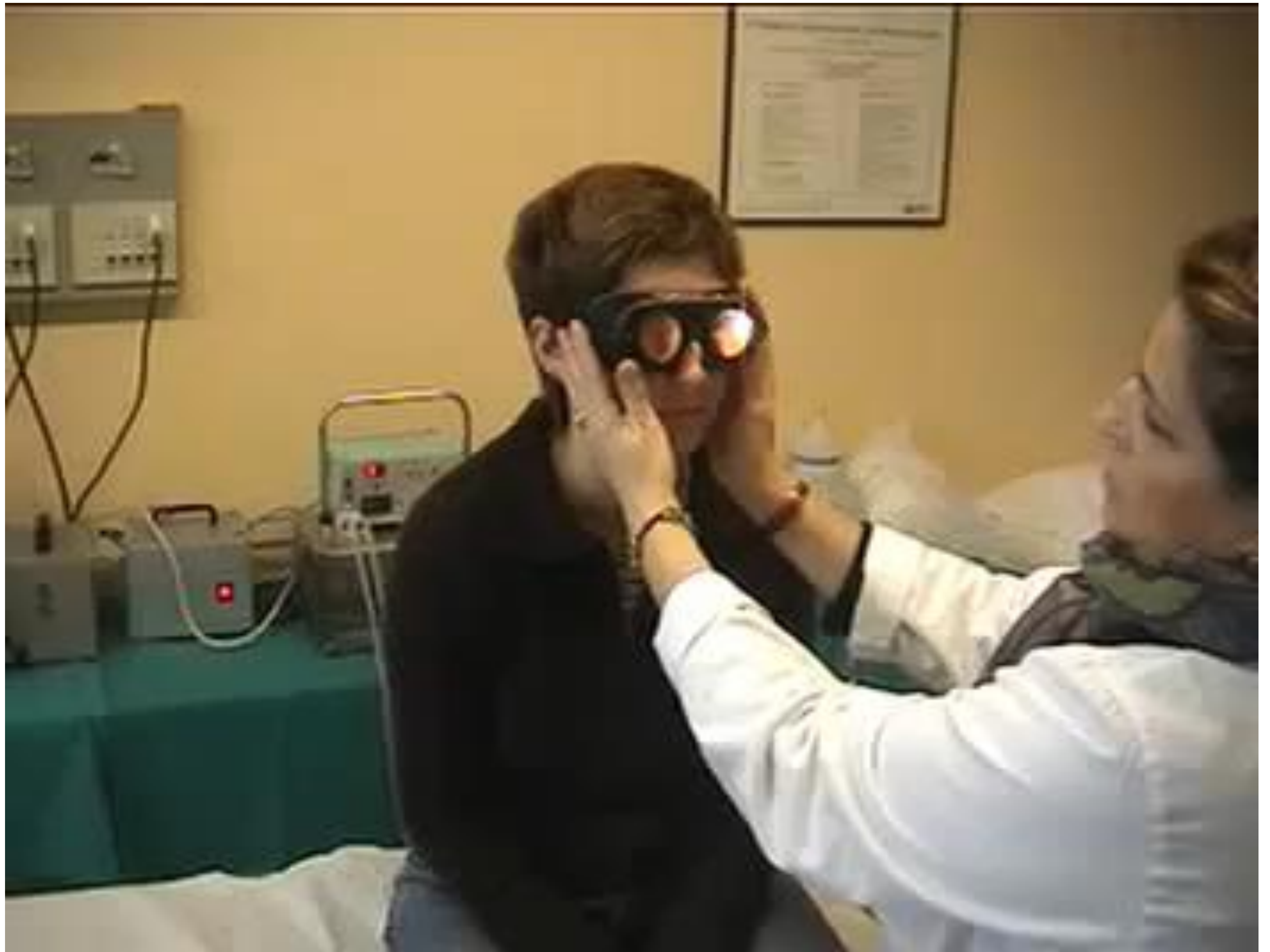
D





Left LC-BPPV

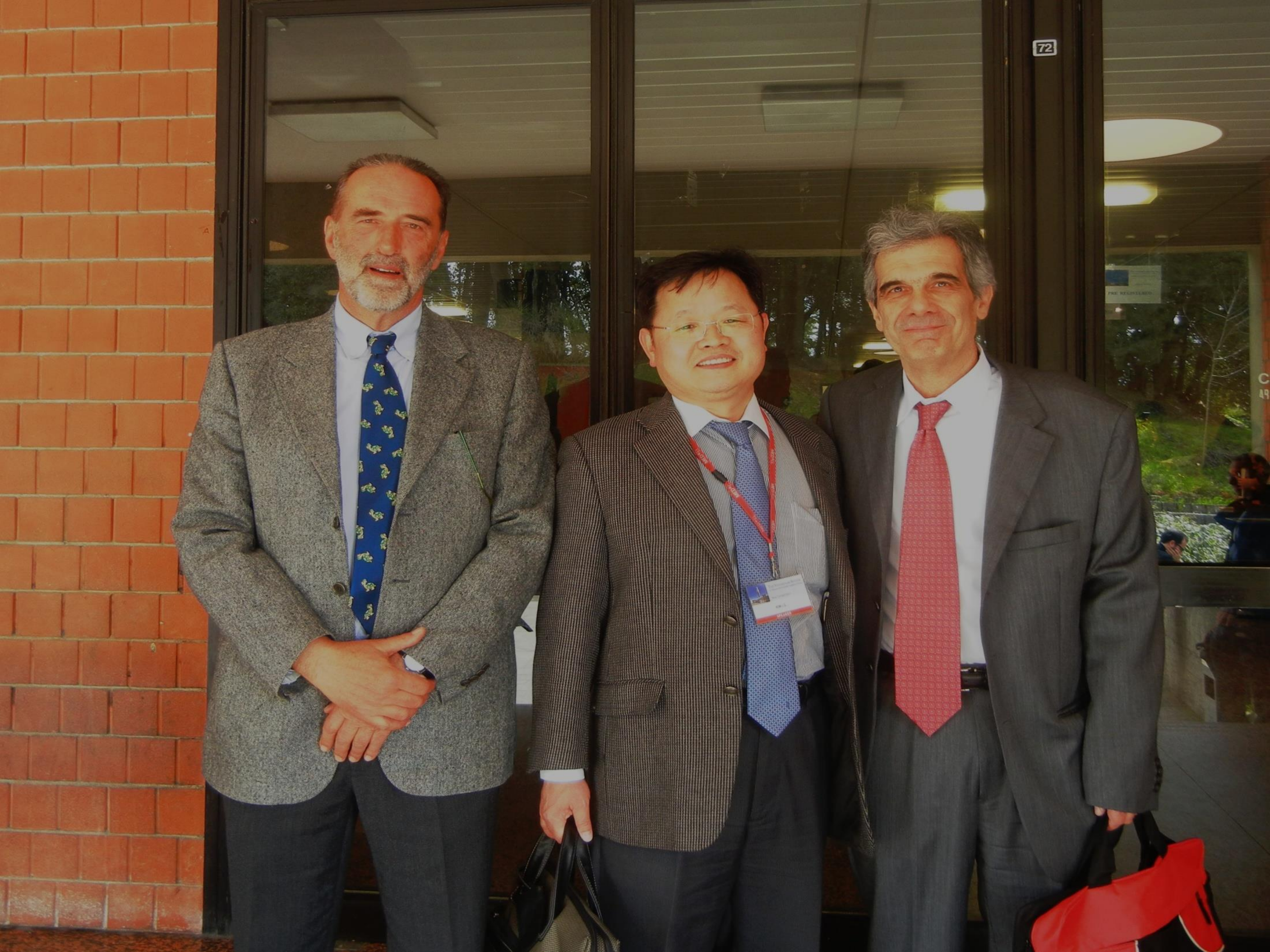




Lateral canal treatment

- Gufoni's maneuver has been validated with randomized double blind trials (Mandalà et al, 2013; Kim JS, 2013)
- Level A of the Evidence Based Medicine (treatment with established efficacy)

- We usually perform a single liberatory manoeuvre and then suggest the patients to lie on the healthy side the following night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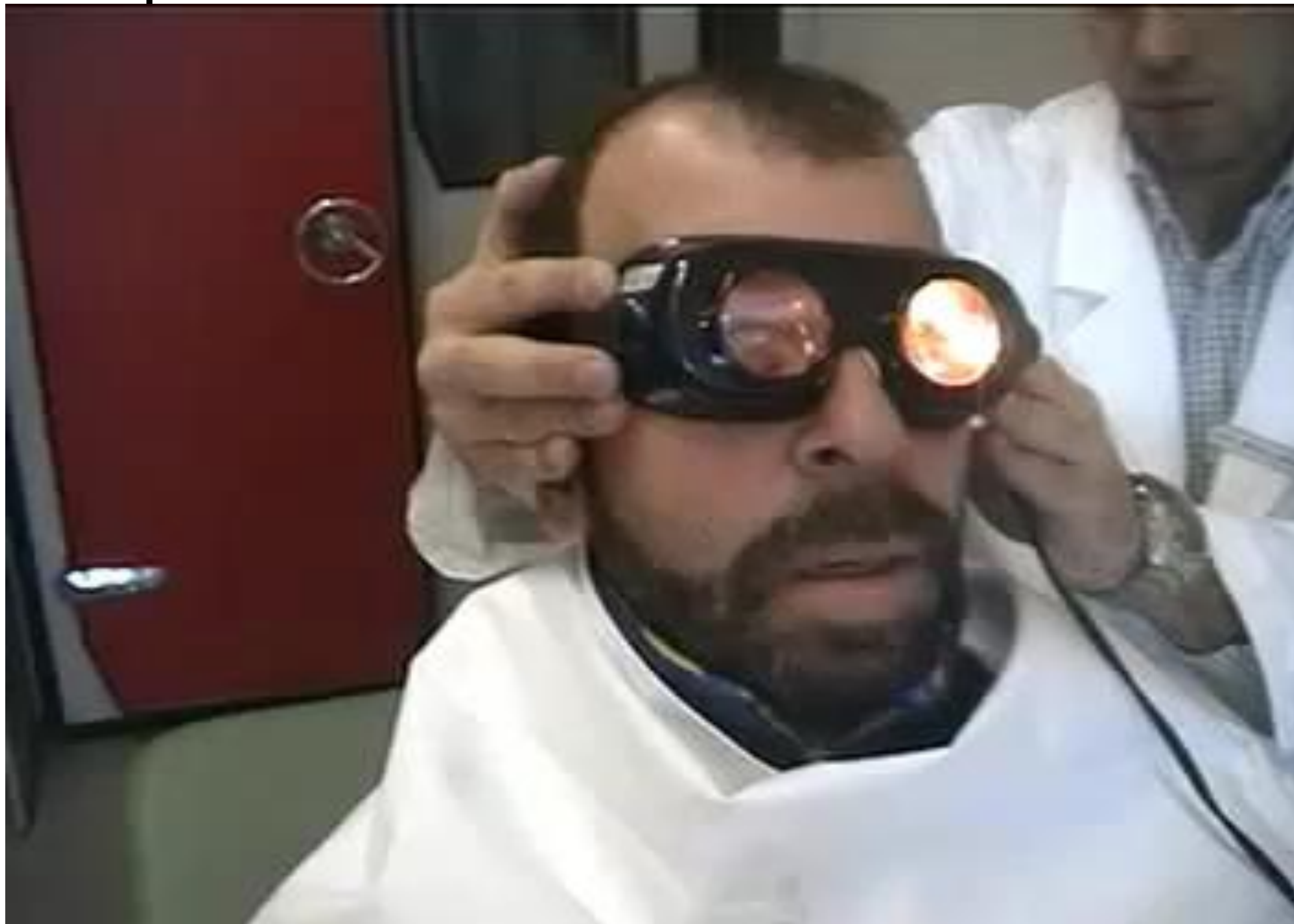
Apogeotropic nystagmus

- Horizontal
- Direction changing
- Beats towards the **uppermost** ear on the two sides
- Usually more intense towards one side (affected side)
- 1) Persistent and long lasting
- 2) Paroxysmal and transitory (lasting longer than in PC-BPPV)

How to manage LC BPPV in the apogeotropic form?

- Many suggestions in recent years
- FPP and/or Gufoni' s maneuver on the affected side and then on the healthy side if apogeotropic nystagmus has become geotropic (two steps procedure)
- Gufoni's modified maneuver (one step)
- Zuma e Maya, 2016 (one step)

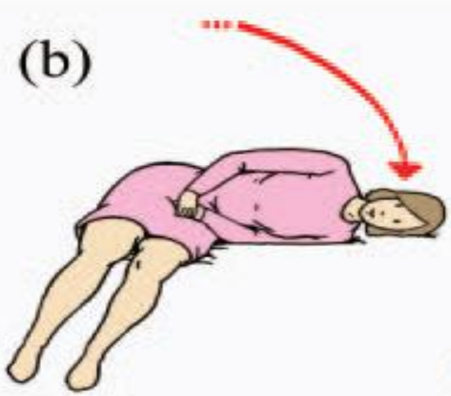
Left LC BPPV (apogeo)

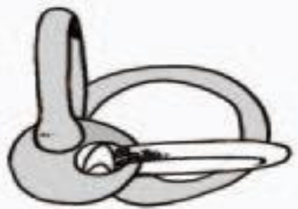


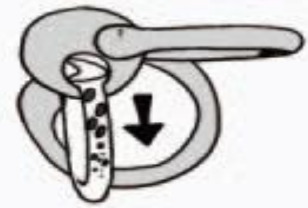
Gufoni to the affected side (left)

Left LC BPPV (geo)

A

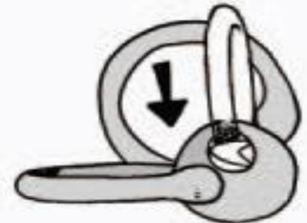






B

Sham maneuver



KIM et al 2013

Right apogeotropic LC BPPV
(Zuma e Maia, 2016)

Slow
Movement
Gravity

Brisk deceleration
Inertia

I

3 min
Side-Lying
on the
affected side

Rapid Angular
Acceleration
Gravity+Inertia

II

3 min
Turned
Upward
90°

Rapid Angular
Acceleration
Gravity+Inertia

90°

3 min

III

Turned
to unaffected side
90°

IV

Slight forward
head tilt

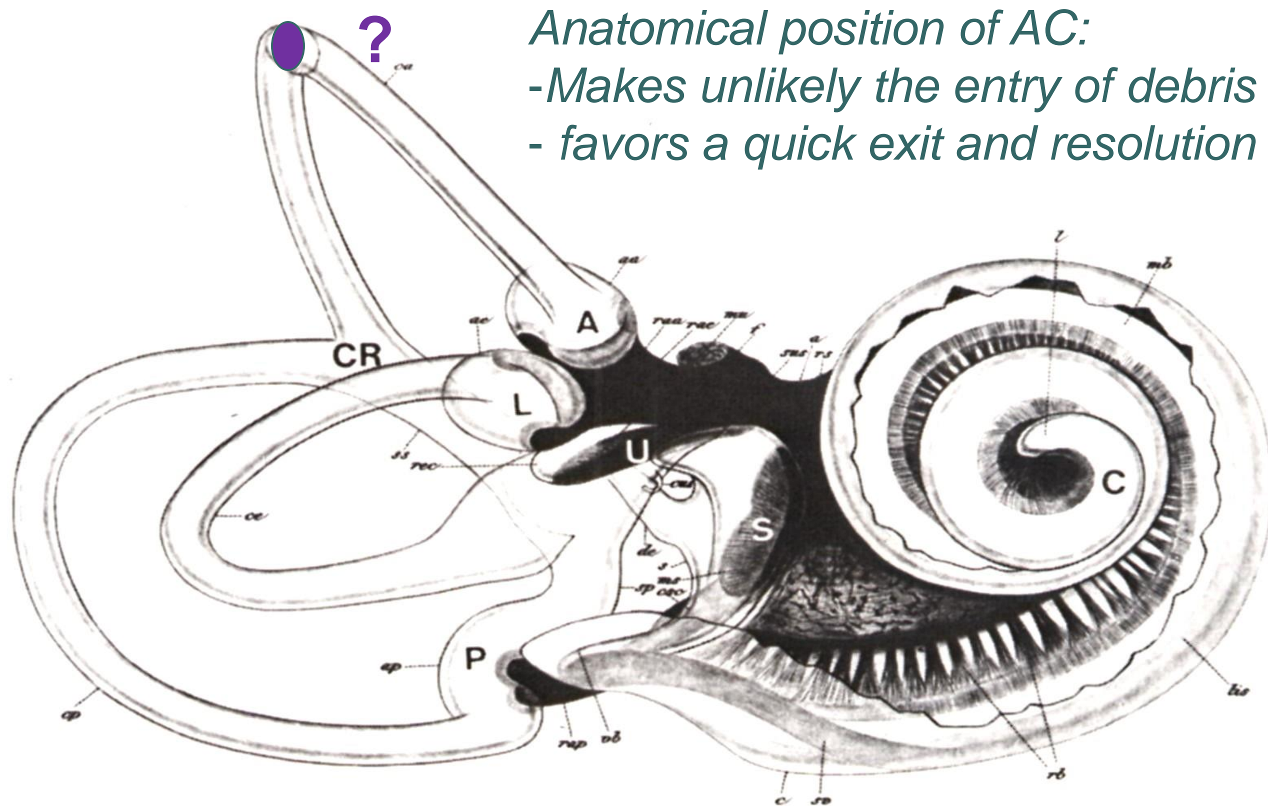
Returned
to the
upright position

V

Gufoni
and Barbecue
mixture

Anterior (superior) Canal BPPV??

- Not well established entity
- Controversy as to its existence
- Controversy as to its treatment



Anatomical position of AC:
-Makes unlikely the entry of debris
- favors a quick exit and resolution

- **Many patients with positional downbeat nystagmus whose characteristics are difficult to justify:**

- *PN elicited in both Dix-Hallpike positions and especially with head hanging*
- *torsional component often not detected (vertical PN in 60%)*
- *dynamic reversal often not detected (>80%)*
- *lack of paroxysm*

PAPER

Positional down beating nystagmus in 50 patients: cerebellar disorders and possible anterior semicircular canalithiasis

P Bertholon, A M Bronstein, R A Davies, P Rudge, K V Thilo

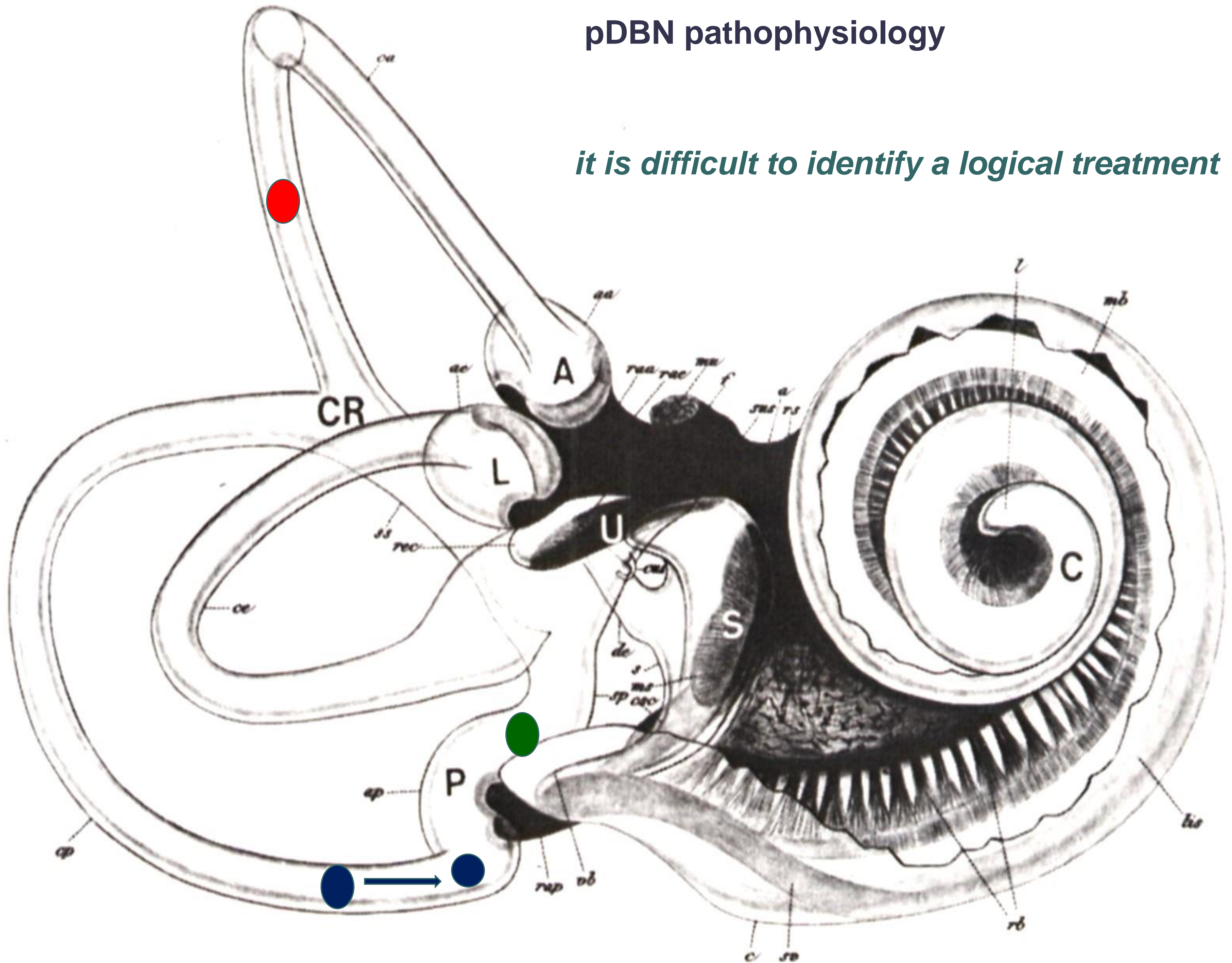
J Neurol Neurosurg Psychiatry 2002;72:366–372

Natural course of positional down-beating nystagmus of peripheral origin

Jacopo Cambi · Serena Astore · Marco Mandalà · Franco Trabalzini · Daniele Nuti

pDBN pathophysiology

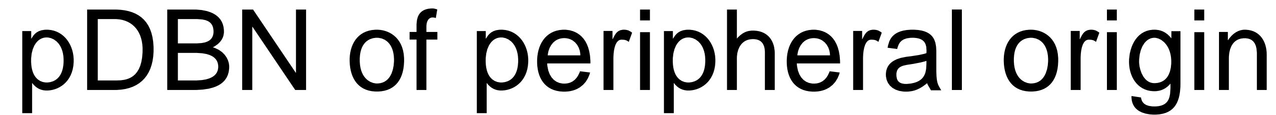
it is difficult to identify a logical treatment



there has been growing interest over the last 20 years

- Honrubia et al. (1999) (Reverse Epley)
- Rahko T (2002)
- Crevits L (2004)
- Kim YK et al (2005)
- Yacovino (2009)

- Canal Plugging (Brantberg & Bergenius 2002)



pDBN of peripheral origin

- Many physical procedures have been proposed for the treatment of AC-BPPV but at present, no controlled studies are available, and their effectiveness is sometimes questionable

Yacovino et al, 2009

Rare immediate recovery

Position 1

Position 2

Position 3

Position 4

- Spontaneous remission in 24 patients (48%) in the first week and in 48 patients (96%) within 4 weeks, without performing any specific treatment
- Important to consider when the efficacy of the physical treatment is evaluated

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THANK YOU!!!