

# Anatomical Structure of Balance



King Saud University  
College of Medicine  
Department of Medical Education

## “...At the Airport”

### Tutorial One

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Year Two, Nervous System Block

Curriculum Development Unit

Student's Case

**Case 2; 2013**

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The Template of the PBL Cases and the Tutor Guide are designed by Professor Samy A. Azer.  
The Student Case is created by

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Mohammad Kumar, a 55-year-old old Indian technician, works in the cargo section as airport navigator. He presents to a local general practitioner because of progressive decreases in his hearing for the last 5 months. Recently he noticed that he becomes unsteady and feels that the surroundings are rotating. He also has noticed numbness on the right side of his face.

**Discussion Questions:**

- Are there any difficult words you do not understand?
- List the key information about Mohammad.
- Identify Mohammad's presenting problems.
- For each problem, generate a list of possible causes (hypotheses).
- What further information would you like to know from history to refine your hypotheses?



Mohammad first noticed that when he uses his mobile phone he hears better on his left ear. About two months ago he reviewed the company doctor and he recommended ear wash because of excessive earwax. This did not help Mohammad and he noticed no improvement in hearing on the right side. Mohammad cannot remember any history of trauma to his ear or chronic ear problems. A few weeks ago he started to hear ringing noises in his right ear.

About 2-3 months ago he noticed that the surroundings are rotating. He particularly feels the surroundings are tilting when he changes the position of his head. This caused a lot of anxiety and worries because of the nature of his job. It is progressively increasing in frequency, first it occurred about once or twice a day, but for the last a few days it occurs about 6 to 7 times a day.

About 3 weeks ago he noticed numbness of the right side of his face particularly while shaving. He gave no history of numbness or tingling anywhere else.

**Past History**

He did not have history of fever, ear discharge, pain or runny nose. He is always fit and never hospitalized and the regular medical checkups at his work are always normal.

**Smoking and Alcohol**

Nil

**Medications and Allergy**

Nil

**Family history**

His parents died at the age of 85 and 81 after a short illness. He has 6 sisters and brothers all are fine.

**Social History**

He is married and has three children. He has been working in King Khalid Airport for over 12 years. He is always fit and healthy. He likes his work. He has not visited his family in India for the last 14 months.

**Discussion Questions:**

- Are there words that you do not understand?
- Summarize key information that you have obtained from this progress.
- Identify Mohammad's new problems. Provide hypotheses for each problem.
- What further information would you like to know by conducting a clinical examination?

## Clinical Examination

(35 minutes)

Mohammad looks anxious and thoughtful. His vital signs are shown in the table below:

Vital signs	Mohammad	Normal range
Pulse rate	82 regular	60-100/min
Blood pressure	130/80 (sitting) and 120/75 (standing)	100/60-135/85 mmHg
Temperature	37.1	36.6-37.2 °C
Respiratory rate	19	12-16/min

### Ear Examination

- Normal external ear
- No ear wax
- Normal healthy tympanic membrane, both sides.

### CNS Examination

- Gait is normal.
- Cranial nerves number: 1 (olfactory nerve), 2 (optic nerve), 3 (oculomotor nerve), 4 (trochlear nerve), and 6 (abducens nerve) are all normal
- The 5<sup>th</sup> cranial nerve (trigeminal nerve): loss corneal reflex on the right side and loss of sensations on the skin over the right maxilla and forehead, normal sensation on the left side..
- The 7<sup>th</sup> cranial nerve (facial nerve): weakness on the right side of the face, normal on the left side of the face. The 8<sup>th</sup> cranial nerve (vestibulocochlear nerve): evidence of sensory neural hearing loss on the right ear, normal on the left ear.
- Other cranial nerves: 9 (glossopharyngeal nerve), 10 (vagus nerve), 11 (accessory nerve), and 12 (hypoglossal nerve) are all normal
- The motor and sensory testing are normal on both sides
- Coordination tests are normal (excluding cerebellar problem)

### Cardiovascular and Respiratory Examinations

Normal

### Discussion Questions:

- Are there words that you do not understand?
- Summarize key information that you have obtained from clinical examination.
- Use the new knowledge obtained from the clinical examination to refine your hypothesis..
- Work out as a team to identify your "learning issues" . .



## Resources

*A note to students:* You are not required to read all these textbooks and resources to prepare for your learning issues. You could use one textbook or one resource for each discipline. For example, for this case you will need to use a resource covering issues related to the case from four disciplines: Physiology, Anatomy, Histology and Medicine. Once you have identified your learning resources, research them for your learning issues and the questions raised in the group discussion. You might choose to use alternative resources other than those listed below:

### **Textbooks:**

- Moore KL, Dalley AF. Clinically Oriented Anatomy. 4th ed. Philadelphia: Lippincott, Williams & Wilkins; 1999.
- Rhoades R, and Pflanzer R. Human Physiology, 4<sup>th</sup> ed. London: Brooks/Cole, 2003.
- Drake RL, Vogl W, Mitchell AWM. Gray's anatomy for students. Philadelphia: Elsevier Churchill Livingstone, 2005.
- Guyton AC and Hall JE. Textbook of Medical Physiology. 10<sup>th</sup> ed. Philadelphia: WB Saunders & Co, 2000.
- Gartner LP and Hiatt JL. Color Textbook of Histology. 2<sup>nd</sup> ed. Philadelphia: WB Saunders & Co, 2001.
- Kumar P and Clark M. Clinical Medicine. 5<sup>th</sup> ed. Edinburgh: WB Saunders, 2002.
- Fox SI. Human Physiology, 9<sup>th</sup> Ed. McGraw Hill, 2005

### **Educational websites and Journals:**

1. <http://aje.oxfordjournals.org/content/163/4/327.full.pdf+html>  
This URL provides you with a pdf copy of a recent paper "Edward CG et al (2006). Exposure to loud noise and risk of acoustic neuroma. Am J Epidemiol 163:327-333. The paper provides new evidence about the risk of prolonged exposure to loud noise and the development of acoustic neuroma.
2. <https://www.medifocus.com/2009/preview.php??a=a&assoc=Google&keyword=acousticneuroma&gid=T L001>  
This website provides you with a preview of the Medifocus Guidebook on acoustic neuroma. It is written in a simple language and provides up-to-date knowledge. You do not read the whole text, scan the chapters using the content page and then focus on areas that can be useful to this case. Areas related to basic sciences and pathophysiology should be useful to you at this stage.
3. <http://www.nlm.nih.gov/medlineplus/acousticneuroma.html>  
This website provides you with basic information about acoustic neuroma. It is written for the public.
4. <http://radiopaedia.org/cases/acoustic-neuroma>

This website introduces you to the radiology images of tumours at the cerebellopontine angle (note that 85% of the cerebellopontine angle tumours are acoustic neuroma).

5. <http://meds.queensu.ca/medicine/otolaryngology/edu/ungrad/pa.htm>

This website introduces you to the physiology and anatomy of the ear, and the hearing mechanisms.

6. [http://en.wikipedia.org/wiki/Cranial\\_nerves](http://en.wikipedia.org/wiki/Cranial_nerves)

This website provides you with key information about cranial nerves, and their functions. The table included is useful.

7. [www.nobelprize.org/](http://www.nobelprize.org/)

Nobelprize.org. is the official website for Nobel Prize. You could search this site for winners in Medicine/Physiology who have made discoveries related to issues raised in this case.