Professor Olivier Dupuis Lebreton

Safety in childbirth

Tome I

Vaginal delivery

(Spontaneous, ventouse, forceps)

Basics

170 Questions, 73 Figures, 20 Exercises

Foreword

1. The author declares that there is no conflict of interest with the pharmaceutical industry.

2. All the procedures mentioned in this work must, whenever possible, be accompanied by explanations by the person performing them.
   Consent from the patient is an essential condition.
   The procedures must be gentle, and appropriate and sufficient analgesia must be offered to the patient.

3. These procedures must be performed, particularly when forceps or the ventouse are used, exclusively by specialist doctors with the appropriate training.

Professor Olivier Dupuis Lebreton

Acknowledgements

To Marie-Caroline, for her detailed rereading of the text.

Note

A paper edition of the French version of this work can be ordered online from the CHEM website.

Question 1

Concept of the “plane of symmetry in the mother’s body”; Concept of “Obstetric Right”; Concept of “Obstetric Left”.

Definition, orientation.

(Figure n°1)

DEFINITION:

The “plane of symmetry of the mother’s body” is also known as the “mother’s plane of symmetry”.

It refers to the longitudinal or sagittal plane that separates the mother’s body into two parts.

In a patient lying in the lithotomy position, this is a vertical plane that goes through the nose, chin, navel, and anus.

ORIENTATION:

By definition, everything that from the mother’s point of view is on the RIGHT of this plane is qualified as “**RIGHT**” or “**OBSTETRIC RIGHT**”.

By definition, everything that from the mother’s point of view is on the LEFT of this plane is qualified as “**LEFT**” or “**OBSTETRIC LEFT**”.

CONCEPT:

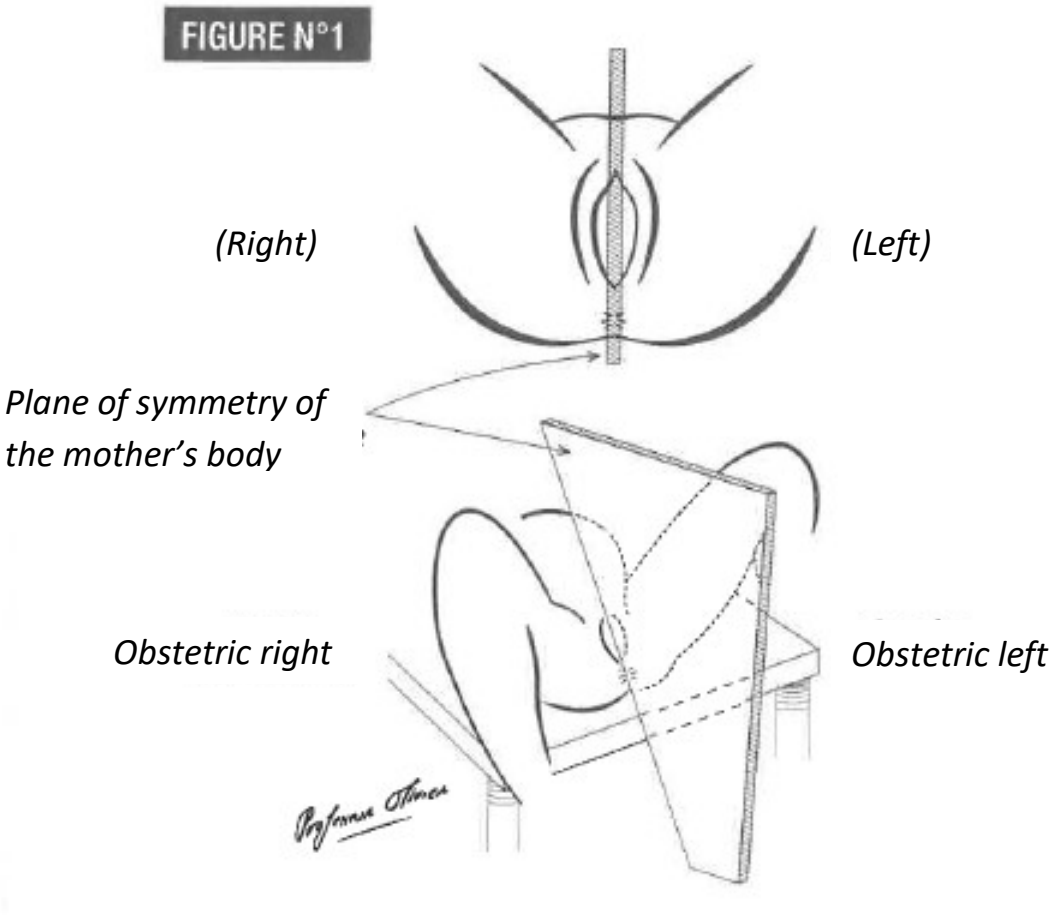
This is the only plane that separates the mother’s body into two parts that are anatomically identical, or more precisely, into two symmetrical parts.

The other two planes (the “coronal plane”, also known as the “frontal plane” (see Question 2) and the “transversal plane”) separate the mother’s body into two anatomically different parts (one part “anterior” and the other part “posterior” for the coronal plane, and one part “cranial” or “superior” and the other “caudal” or “inferior” for the transversal plane).

It is a very good idea to imagine this plane spatially in your head.

In a patient lying in the lithotomy position, this is a vertical plane that goes through the nose, chin, navel, and anus. This plane of symmetry is an essential first marker for learning how to handle the extraction instruments spatially, but it is not enough to orientate yourself correctly (Figure n°1).

It makes it possible to define the notion of “obstetric right” and “obstetric left”.



The plane of symmetry of the (body of the) mother when the woman is lying in the lithotomy position. This plane is a vertical plane that passes through the nose, navel, and anus, dividing the mother's body into two identical halves. Everything that is, from the mother's point of view, on the right of this plane is termed "RIGHT" or "OBSTETRIC RIGHT", while everything that is, from the mother's point of view, on the left of this plane is termed "LEFT" or "OBSTETRIC LEFT".

Question 2

Defining a second marker that makes it possible to improve identification of the space situated around the mother: the coronal, or frontal, plane.

Concept of "Anterior" or "Obstetric Anterior" and the concept of "Posterior" or "Obstetric Posterior".

(Figure n°2)

CONCEPT

When the mother is lying in the lithotomy position, the coronal or frontal plane is horizontal.

It is easy to represent this plane by imagining a horizontal board that is slid under the body of the mother who is in the lithotomy position, and imagining that this plane is parallel to the board, situated 5 cm above the board and cutting the patient into two parts, passing halfway between the pubis and the anus (Figure n°2).

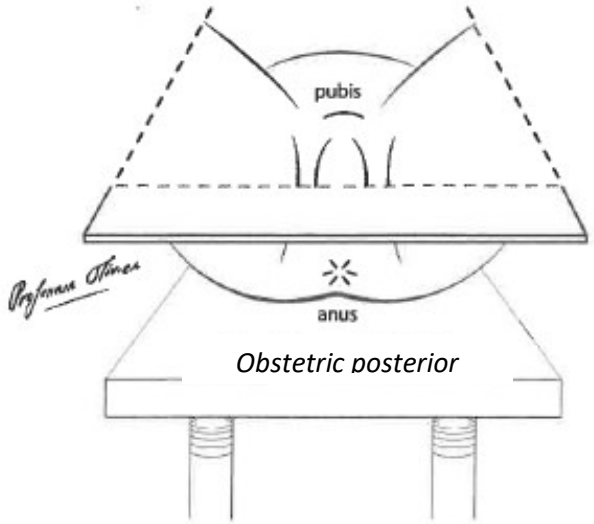
DEFINITION

Everything that is **ABOVE this plane is referred to as "ANTERIEUR", and this is the concept of** "**OBSTETRIC ANTERIOR**", and everything that is **BELOW this plane is referred to as "POSTERIOR", and this is the concept of "OBSTETRIC POSTERIOR."**

(Figure n°2)

FIGURE N°2

Obstetric anterior



Obstetric posterior

Coronal, or frontal, plane

When the woman is lying in the lithotomy position, this is a HORIZONTAL PLANE, which passes half-way between the pubis and the anus. Everything that is ABOVE this plane is termed “ANTERIOR” or “OBSTETRIC ANTERIOR”, while everything that is BELOW this plane is termed “POSTERIOR” or “OBSTETRIC POSTERIOR”.

Question 3

Concept of “Cranial” or “Superior” and “Caudal” or “Inferior”

Transversal plane

(Figure n°3)

Orientation is vital in obstetrics.

In Questions 1 and 2, we defined what “Right” and “Left” refer to, and what “Anterior” and “Posterior” refer to for an obstetrician.

The orientation of the foetus, and the orientation of the instruments, can thus easily be visualised in spatial terms by indicating whether the foetus or the instrument is “on the right” or “on the left”, or “anterior” or “posterior”.

But for even greater precision, we need a third plane. Effectively, to correctly situate a point in space, we need not two markers, but three.

The first marker is the sagittal plane, which we refer to as “the mother’s plane of symmetry” (see Question 1, Figure n°1)

The second marker is the coronal or frontal plane, which we refer to as the “horizontal plane” (see Question 2, Figure n°2).

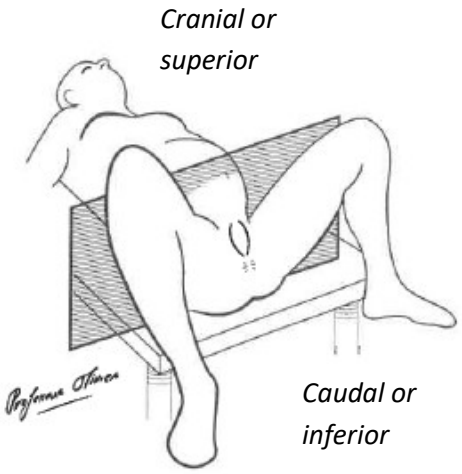
The third marker is a transversal plane.

In a woman lying down, this plane is a vertical plane, perpendicular to the symmetry of the body of the mother. It passes halfway between the pubis and the coccyx, and it separates the mother’s body into two parts that are anatomically different: a **superior, or cranial, part**, with the head, thorax, upper limbs, and part of the pelvis, and an **inferior or caudal part**, with part of the pelvis and the lower limbs.

By definition, everything situated on the side of the mother’s head is referred to as “Cranial” or “Superior”, and everything that is on the side of the mother’s feet is referred to as “Caudal” or “Inferior”.

(Figure n°3)

FIGURE N°3



Transversal plane

In the woman lying in the lithotomy position, this plane is vertical, running perpendicular to the plane of symmetry of the mother. Everything that is on the side of the mother's head is termed "CRANIAL" or "SUPERIOR", while everything that is on the side of the mother's feet is termed "CAUDAL" or "INFERIOR".

Question 4

Plane of symmetry of the foetus' head.

Definition

(Figure n°4)

DEFINITION

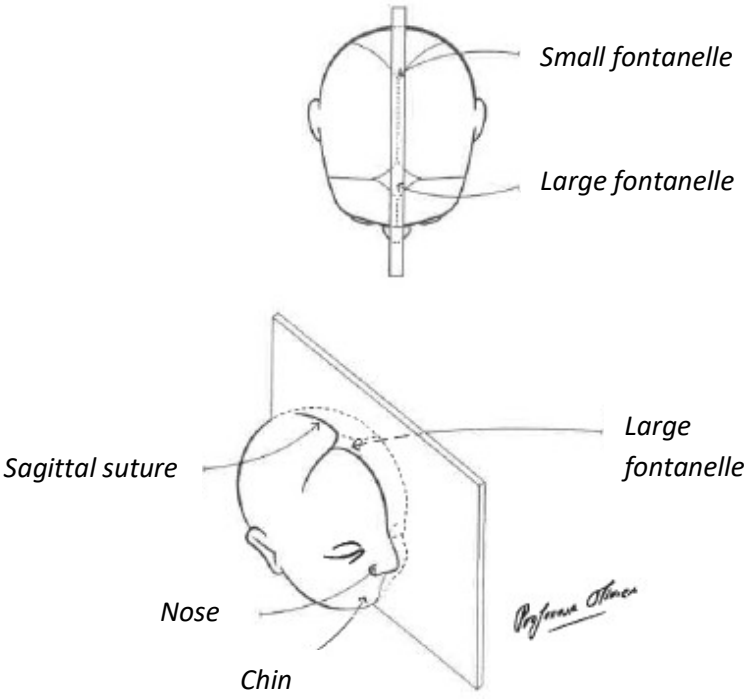
The plane of symmetry of the foetus' head is the sagittal plane that separates the foetus' head into two identical parts.

When we talk of "right" or "left", we thus always mean "the mother's right", that is, the "obstetric right", and "the mother's left", that is, the "obstetric left".

This plane passes through the middle of the small fontanelle, the sagittal sutures, then through the middle of the large fontanelle, the root of the nose and the middle of the chin (Figure n°4).

The orientation is always given in relation to the mother's plane of symmetry.

FIGURE N°4



Plane of symmetry of the foetus' head

This is the plane that separates the foetus' head into two identical parts

Question 5

Exercise 1

Of the three planes, A, B, and C shown in the following figure (Figure n°5), indicate which is the "mother's plane of symmetry".

Check your answer with Figure n°6.

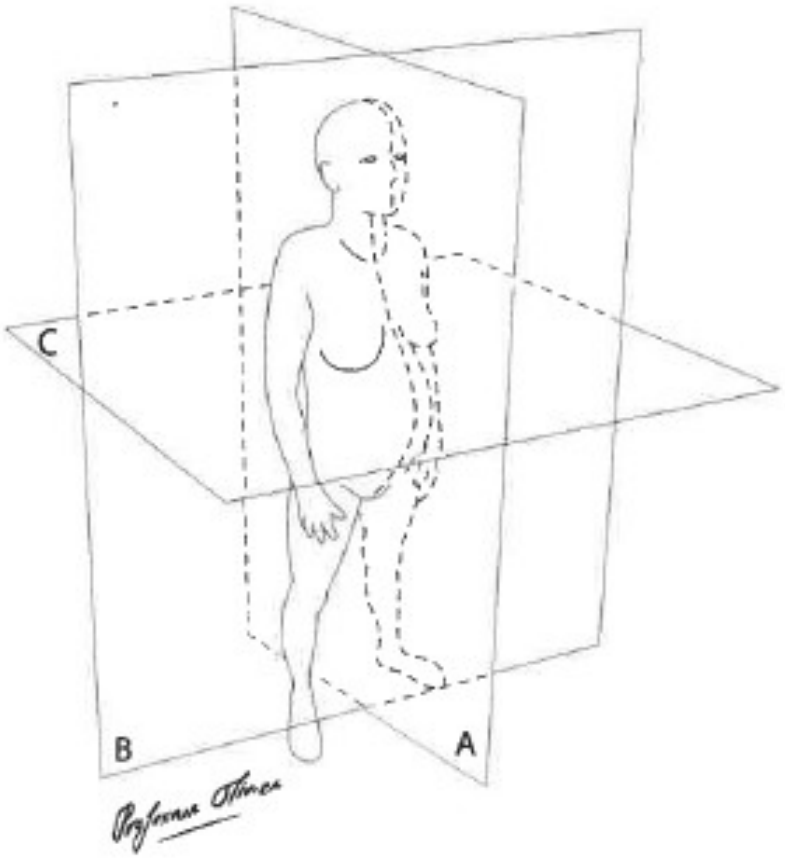
(Figures n°5 and n°6)

FIGURE N°5

Exercice n° 1

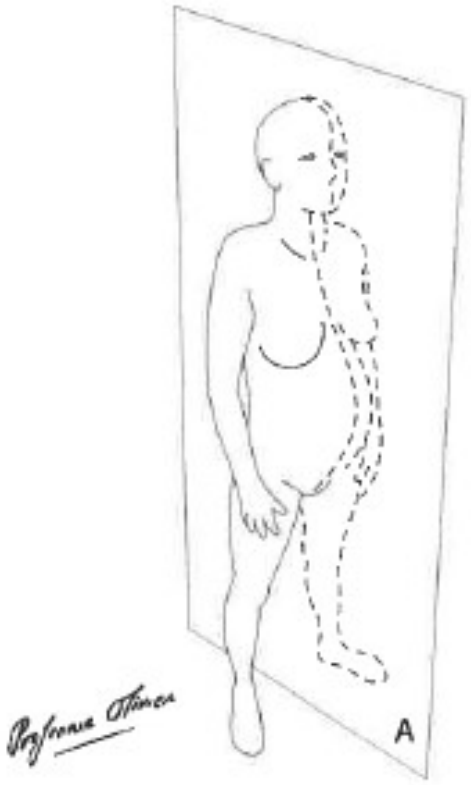
Plane of the mother:

Indicate which of the following planes, A, B, or C, is the "plane of symmetry of the mother".



(Answer: see page 411)

FIGURE N°6 **Answer to Exercise n°1**



Question 6

Exercise 2

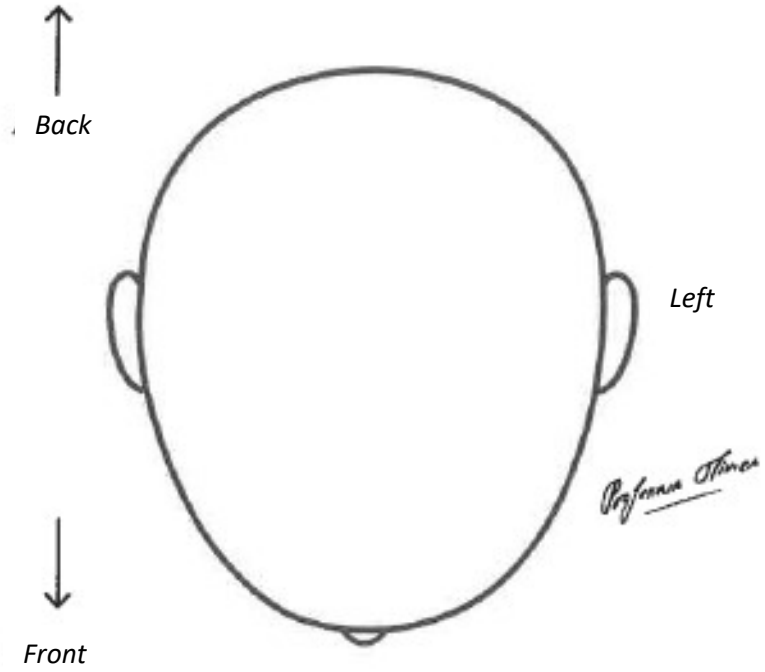
On the drawing of the foetus' skull seen from above shown in Figure n°7, draw in both the large and small fontanelles and the sutures.

Check your answer with Figure n°8.

(Figures n°7 and n°8)

Fœtal skull to be completed by drawing in the sutures and both fontanelles

FIGURE N°7 **Exercice n°2**

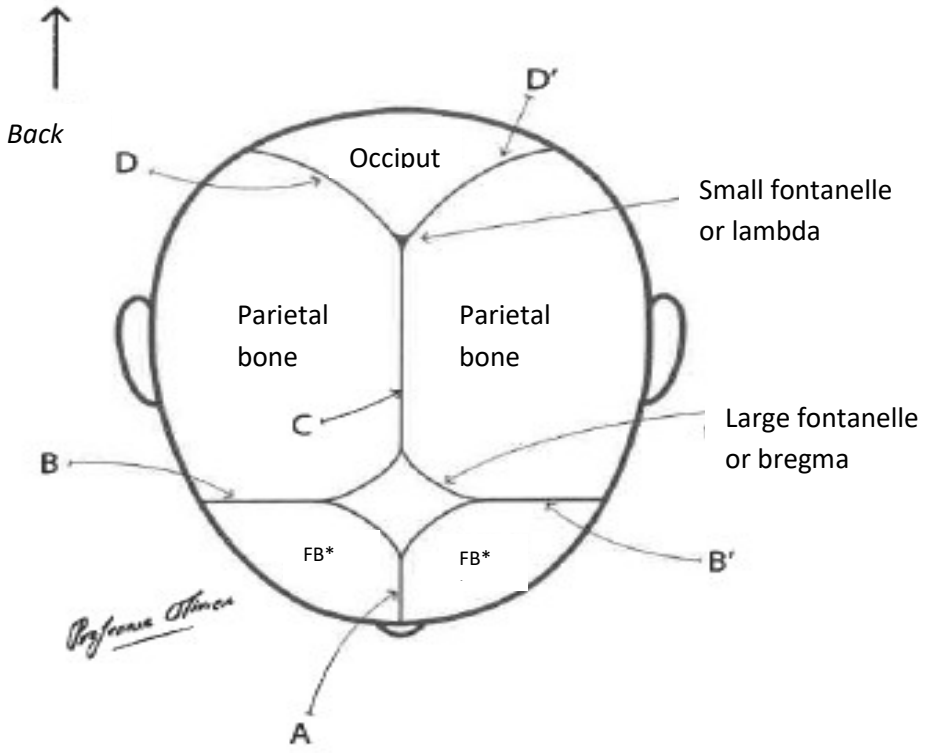


Draw in the sutures and fontanelles on this foetal head seen from above.

(Answer: compare your drawing with Figure N°8)

Both fontanelles, both parietal bones, the occipital bone, both frontal bones and the six sutures

FIGURE N°8



Head of the foetus
Seen from above
A = frontal suture
B and B' = coronal sutures
C = sagittal suture
D and D' = lambdoid suture
FB* = Frontal Bone

Question 7

Indicate the anatomical characteristics of the small fontanelle (Synonym? Shape? Edges? Surface in cm^2?)
Indicate how to recognise it in a vaginal examination by completing the following questionnaire.

(Figure n°8)

Synonym for the small fontanelle: ……

Shape of the small fontanelle: ……

Edges of the small fontanelle: ……

Surface in cm^2: ……..

Recognition on vaginal examination: ……

……..

……..

(Answer: on the next page)

SYNONYM

The synonym of the small fontanelle is the lambda.

SHAPE

The small fontanelle is shaped like the Greek letter lambda in its typed little letter form (λ), that is, the shape of an upside-down Y, hence its name.

EDGES

The small fontanelle is composed of three sutures: the longitudinal suture, known as the sagittal suture, which separates the two parietal bones, right and left, and extends on one side with the suture between the right parietal bone and the occiput, known as the right lambdoid suture, and on the other side by the suture between the occiput and the left parietal bone, known as the left lambdoid suture (see Figure n°8).

SURFACE IN CM^2

The "small fontanelle" has an average surface area of 0.51 cm^2 (personal research, unpublished).

It is important to note that many anatomical drawings, as well as certain simulators for new-borns, fail to give a conform anatomical vision of the small fontanelle, which is often represented by a surface that is much larger than what is seen in reality.

RECOGNITION ON VAGINAL EXAMINATION

It is a solid structure, that is, it is hard. The small fontanelle can be recognised by passing a fingertip along the foetus' skull. The finger will pass successively over the 3 sutures that compose it and make the shape of an upside-down Y (λ) (Figure n°8).

Question 8

Indicate the anatomical characteristics of the large fontanelle (Synonym? Shape? Edges? Surface in cm^2?)

Indicate how to recognise it in a vaginal examination.

(Figure n°8)

Synonym of the large fontanelle: ……

Shape of the large fontanelle: ……

Edges of the large fontanelle: ……

Surface in cm^2: ……

Recognition on vaginal examination: ……

……

……

(Answer: on the next page)

SYNONYM

The synonym of the large fontanelle is the bregma.

This term comes from the Greek, and means “to wet”, “to drench”, and refers to its soft structure, still damp because it has no bone covering.

SHAPE

The large fontanelle is shaped like a lozenge.

EDGES

The large fontanelle is bordered by the angles of the two frontal bones, which are separated by the frontal suture and the angles of the foetus’ two parietal bones.

Each parietal bone is separated from the frontal bone by a suture known as the coronal suture.

SURFACE IN CM^2

The large fontanelle has an average surface area of 3.55 cm^2 (personal research, unpublished).

RECOGNITION ON VAGINAL EXAMINATION

This is a soft, depressible structure that is thus relatively easy to recognise.

The operator’s fingertip can recognise the edges by following the outline of the lozenge and palpating the soft surface that has thus been outlined (Figure n°8).

Question 9

What is the distance (in centimetres) that separates the large fontanelle from the small fontanelle?

The large and small fontanelles are separated on average by a distance of 9.48 cm (personal research, unpublished).

Anatomically, the large and small fontanelles are situated in the plane of symmetry of the foetus' head, 9.48 cm from each other (Figure n°8).

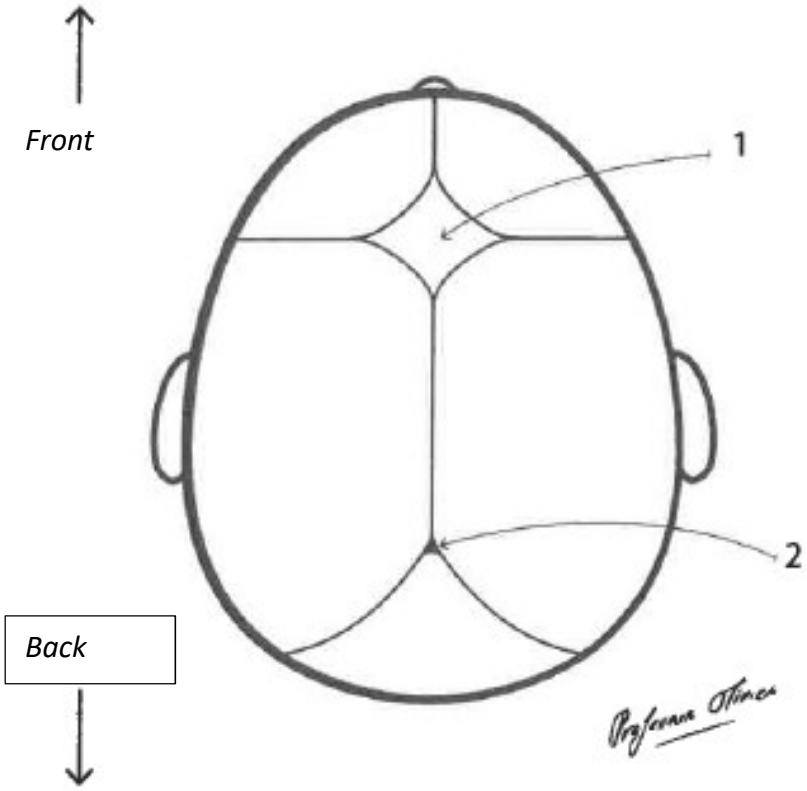
Question 10

Exercise 3

On the following Figure (n°9), does the bregma correspond to marker 1 or marker 2?

(Figure n°9)

FIGURE N°9 **Exercice n°3**



Does the bregma correspond to marker n°1 or n°2?

(Answer: see page 411)

Question 11

What is the galea?

Give a definition and the function of the galea and compare your answers with those on the next page.

(Figure n°10)

DEFINITION

The galea, also known as “epicranial aponeurosis”, goes from the brow bones of the foetus to the most posterior part of the occiput. In Latin, “galea” means “helmet”.

(Figure n°10).

FUNCTION

In adults, the skull is hard, and the bones of the skull are fused to each other.

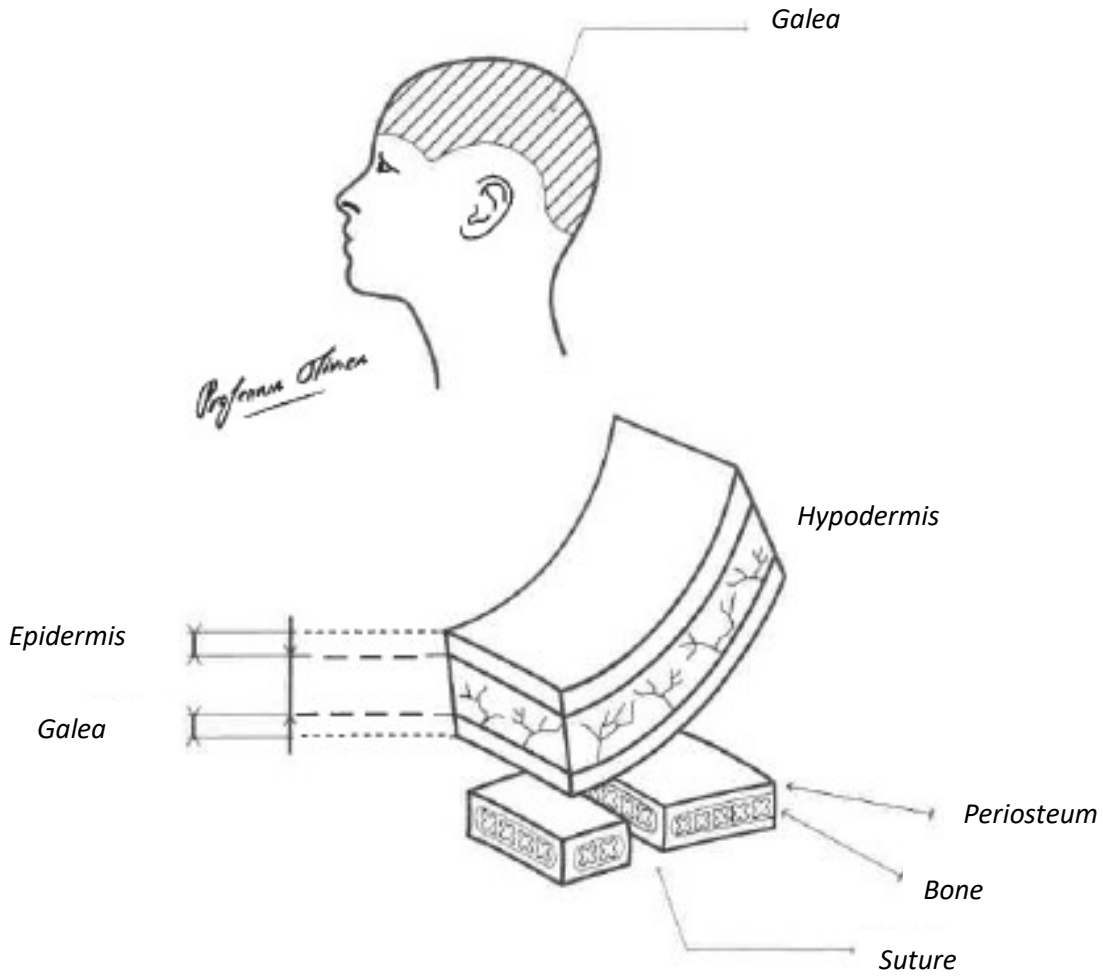
On the contrary, in foetuses, the skull is soft, and it is thus necessary for an anatomical structure to fuse the skull bones. This is the function of the epicranial aponeurosis (or galea aponeurotica).

It is an aponeurosis, or solid membrane, that covers all the bones in the foetus’ skull, and which forms a bridge over the bones and sutures. It thus maintains the bones of the foetus’ skull.

Under this aponeurosis is the detachable Merkel space.

(Figure n°10)

FIGURE N°10



Question 12

Draw the shape of a foetus' head and label its two diameters, the large diameter and the small diameter.

(Figure n°11)

A foetus' head can be compared to an ovoid: it is in the shape of an egg.

Figure n°10 shows the head of a foetus in profile and highlights this egg shape.

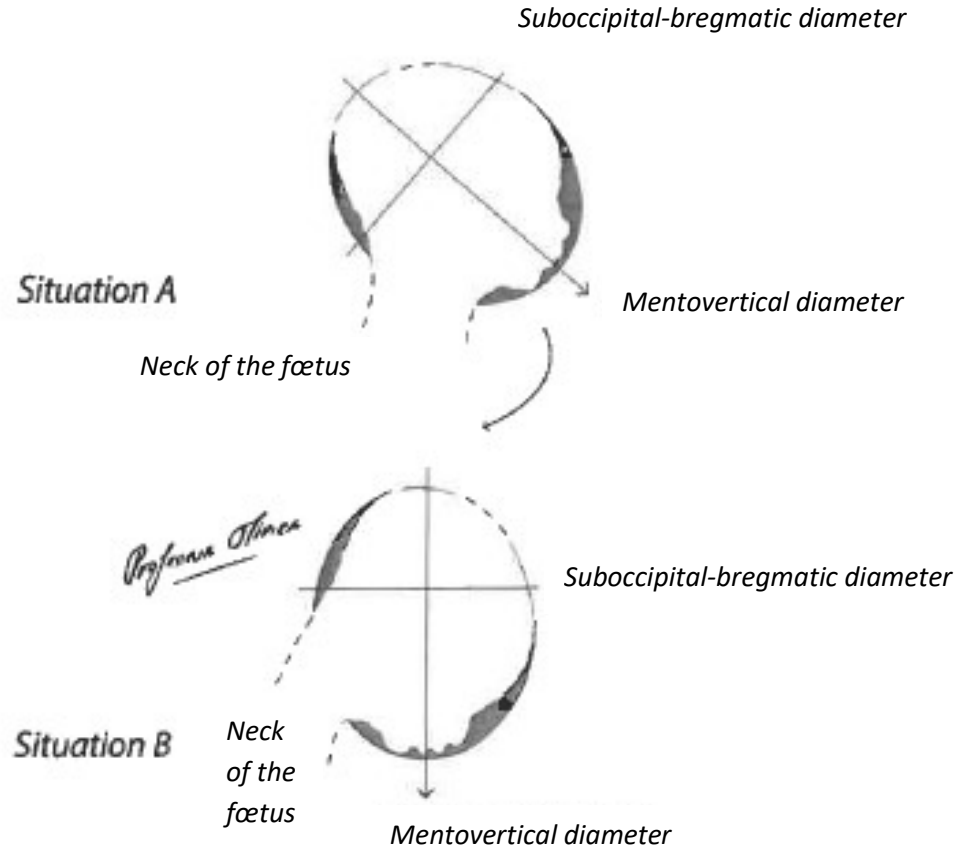
The ovoid has two diameters: one large, which is the mento-vertical or mento-occipital diameter, between 13 and 13.5 cm, and a small diameter, the suboccipital-bregmatic diameter, which links the bregma and the occipital hole, 9.5 cm.

When the foetus bends its head, its chin touches its thorax and the mento-occipital diameter (Situation A in Figure n°11) becomes vertical (Situation B in Figure n°11).

This is why this diameter is also known as the mento-vertical diameter.

(Figure n°11)

FIGURE N°11



The flexion of the head of the foetus makes the mentovertical diameter vertical. We thus move from Situation A to Situation B.

Question 13

What is the centre of the figure?

The centre of the figure is the point of intersection between the two diameters of the cephalic ovoid. That is, the point of intersection of the suboccipital-bregmatic diameter and the mentovertical diameter. It is an imaginary point situated on the head of the foetus.

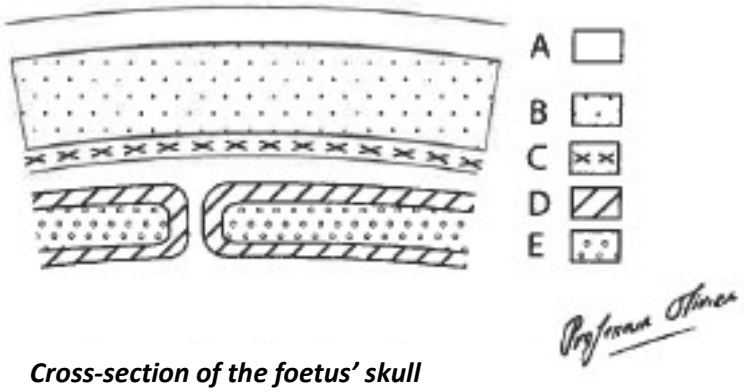
Question 14

Exercise 4

Of the five markers, A, B, C, D, and E shown in Figure n°12, indicate which one corresponds to the galea aponeurotica.

(Figure n°12)

FIGURE N°12 Exercice n°4



Cross-section of the foetus' skull

Which of the markers A, B, C, D, or E corresponds to the galea?

(Answer: see page 411)

Question 15

What is the difference between “parity” and “vaginal parity”?

Explain the concept of vaginal parity.

Parity corresponds to the number of children a woman has had, regardless of the mode of delivery.

Thus:

- a woman who has had two children via vaginal delivery is multiparous (para 2)

- a woman who has had one child born via caesarean is primiparous (para 1)

- a woman who is pregnant with her first child is nulliparous (para 0)

Parity is indicated in medical files with a "P".

But from the point of view of delivery and obstetric mechanisms, parity is not a very interesting parameter.

The "multiparous" group effectively includes women who have only given birth via **caesarean, along with women who have only given birth vaginally, as well as women who have given birth via caesarean and vaginally.**

However, it is essential to distinguish two groups of pregnant women:

– The group of women who have never given birth vaginally, which includes women who have not

had children and those who have given birth via caesarean once or multiple times.

This group is referred to as the "Vaginal nulliparous" group.

And

– The group of women who have given birth one or more times vaginally, regardless of whether the delivery was spontaneous, via ventouse or via forceps.

This group is referred to as the "Vaginal primiparous" or "Vaginal multiparous" group.

Note: A woman who has given birth once vaginally is a "vaginal primipara", but by extension she can be assimilated into the "vaginal multiparous" group to distinguish her from the "vaginal nulliparous" group. *From a biomechanical point of view, it is the distinction between vaginal nulliparous on the one hand and vaginal primiparous or multiparous on the other that is essential.*

Question 16

Exercise 5

Definition of the three phases of labour.

Indicate when each phase starts and when each phase ends by filling in the table below.

	First phase of labour	Second phase of labour	Third phase of labour
Start	……	……	……
Finish	……	……	……

Labour is divided into three phases:

The first phase of labour*:*

Start: Labour start time

Finish: Time of arrival at full dilation (when the cervix reaches 10 cm of dilation).

The second phase of labour*:*

Start: Time of arrival at full dilation (when the cervix reaches 10 cm of dilation).

Finish: Time of birth

The third phase of labour*:*

Start: Time of birth

Finish: Delivery of the placenta (expulsion of the placenta and membranes)

Question 17

The first phase of labour is divided into two parts. What are they?

Indicate the particularity and duration of each of these two parts.

The first part is the "Latent phase"

Definition: The latent phase starts with the start of labour and ends when the patient's cervix is dilated to 4 or 5 cm.

Particularity and duration: The duration is highly variable from one woman to another, and it is difficult to predict.

It can last from a few hours to several dozen hours.

The second phase is the "Active phase"

Definition: This phase starts when the patient's cervix has reached 4 to 5 cm of dilation and ends when the patient reaches complete dilation, that is, 10 cm of dilation.

Particularity and duration: It lasts around 6 hours, that is, 1 cm of dilation per hour.

Question 18

Indicate the two parameters that have the greatest influence on the duration of the second phase of labour and give the indicative duration for each of the four cases.

(Figure n°13)

The two parameters that have the greatest influence on the duration of the second phase of labour are:

– Vaginal parity

– The presence or absence of epidural analgesia (EDA).

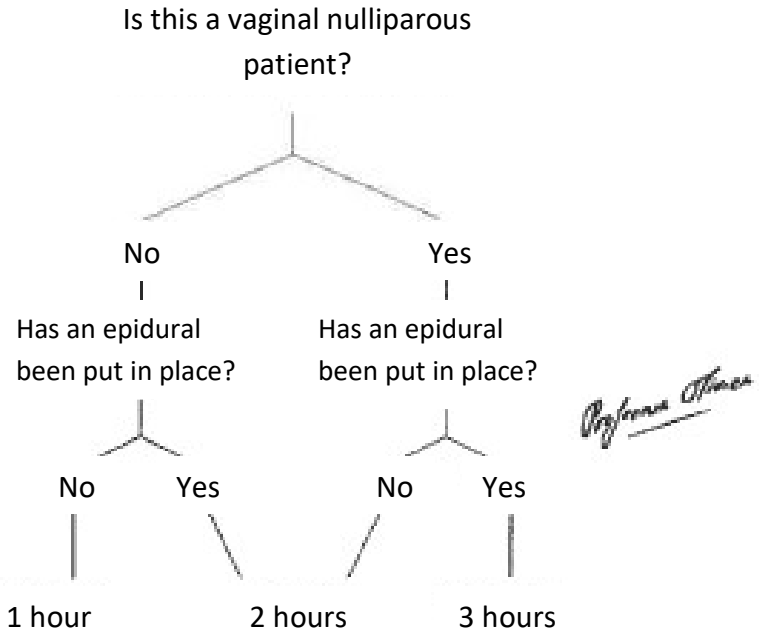
Four cases can be retained:

- vaginal nulliparous with epidural analgesia
- vaginal nulliparous without epidural analgesia
- vaginal multiparous with epidural analgesia
- vaginal multiparous without epidural analgesia

The respective **durations** are:

- vaginal nulliparous with epidural analgesia: 3 hours
- vaginal nulliparous without epidural analgesia: 2 hours
- vaginal multiparous with epidural analgesia: 2 hours
- vaginal multiparous without epidural analgesia: 1 hour

FIGURE N°13



Time between the patient reaching full dilation and the start of the expulsive efforts (normal FHR)

Question 19

Exercise 6

Label then fill in the document that makes it possible to monitor the progression of labour on Figure n°14, indicating:

– the name of the *x* axis

– the name of the *y* axis

and draw in the curve, indicating what each of the four cardinal reference points A, B, C and D refer to, then compare your diagram with that in Figure n°15.

(Figures n°14 and n°15).

FIGURE N°14 Exercice n° 6

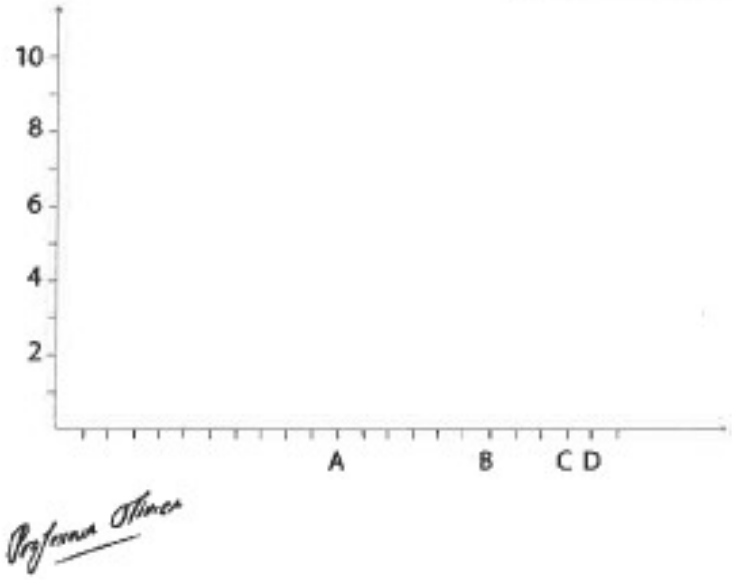
Y axis:

……

This diagram is called:

……

……



X axis:

……

……

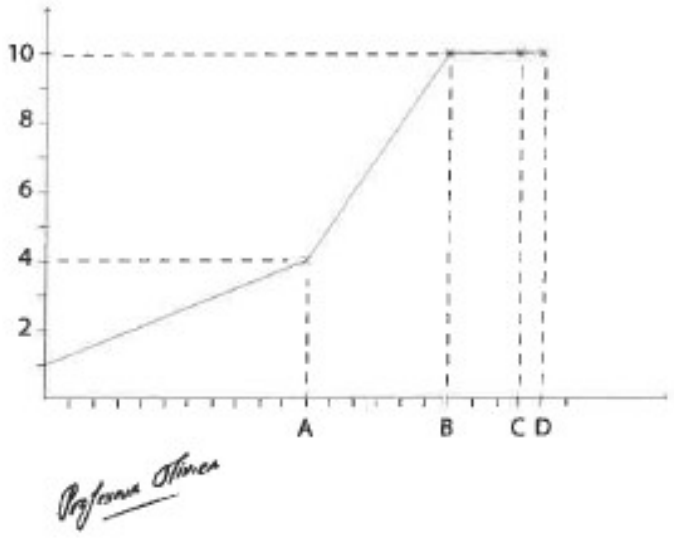
Fill in the legend for the *x* and *y* axes.

Say what the reference points A, B, C, and D correspond to.

FIGURE N°15

y axis: dilation of the cervix (in cm)

This diagram is called a partogram



x axis = time in hours

A = time at which the patient reached 4 cm dilation of the cervix
B = time at which the patient reached 10 cm dilation of the cervix
C = time of birth
D = time of delivery of the placenta

Question 20

What is the most important contraindication for operative vaginal deliveries?

(That is, failure to respect this contraindication can lead to serious incidents.)

The existence of **significant cephalopelvic disproportion**, that is, all cases where the mother's pelvis is too small in relation to the head of the foetus, is the most important contraindication for performing an operative vaginal delivery.

In these cases, there is effectively a risk of foetal trauma.

When the cephalopelvic disproportion is moderate, an instrument delivery is not formally contraindicated but extreme caution is necessary, and under no circumstances should a complex delivery be performed.

When significant cephalopelvic disproportion is suspected, an operative vaginal delivery is contraindicated, and it is more prudent to perform a caesarean.

Knowing how to recognise the signs of cephalopelvic disproportion is thus essential.

Question 21

What are the three signs of cephalopelvic disproportion that must systematically be screened for on the foetus' head before performing an operative vaginal delivery?

The three signs of cephalopelvic disproportion that must systematically be screened for on the head of the foetus before performing an operative vaginal delivery are:

- **moulding of the head**

- a **caput succedaneum**

- **asynclitism of the head**

These three signs only appear if there is cephalopelvic disproportion.

This is why the value of each of these signs is greater than that of the estimated weight of the foetus, which is in no way synonymous with cephalopelvic or foetopelvic disproportion.

If a patient has a wide pelvis, she will give birth without problem to a child weighing more than 4000 g, whereas if she has a small pelvis, she will be unable to give birth to a child weighing 3000 g.

Question 22

What is “moulding” of the foetus’ head and how do you diagnose it?

Unlike in adults, whose skull bones are fused, the skull of a foetus is composed of bones that are separated by non-fused sutures. In this way, the bones of a foetus' skull retain a certain mobility. This allows the foetal skull to adapt to the mother's birth canal.

But this ability of the foetus' skull to adapt has its limits. We can compare the skull bones of a foetus to tectonic plates, with one plate lifting another…

This phenomenon is called "moulding".

If the foetus' head is too large in relation to the mother's pelvis, the skull is compressed, the bones of the skull will come closer together, touch and then at their maximum, slide one over the other, leading to **overlap** occurring.

Before performing a delivery, it is always necessary to search for signs of moulding.

To look for these signs, **perform a vaginal examination** (VE) during which the doctor palpates the bones of the foetus' skull. The fingertips of the index and middle fingers palpate the entire surface of the foetus' skull: normally, this surface is smooth, and the finger moves from the surface of one bone, to the surface of another without feeling a change in level, the doctor can simply feel the small depressions in the shape of furrows, corresponding to the sutures and the depression of the large fontanelle.

If you can feel a sort of "step", or change in level between the two bones of the skull, that means there is overlapping of the skull bones. This indicates significant moulding and thus significant cephalopelvic disproportion.

Question 23

Explain and draw the various stages of "moulding" of the foetus' head.

(Figure n°16)

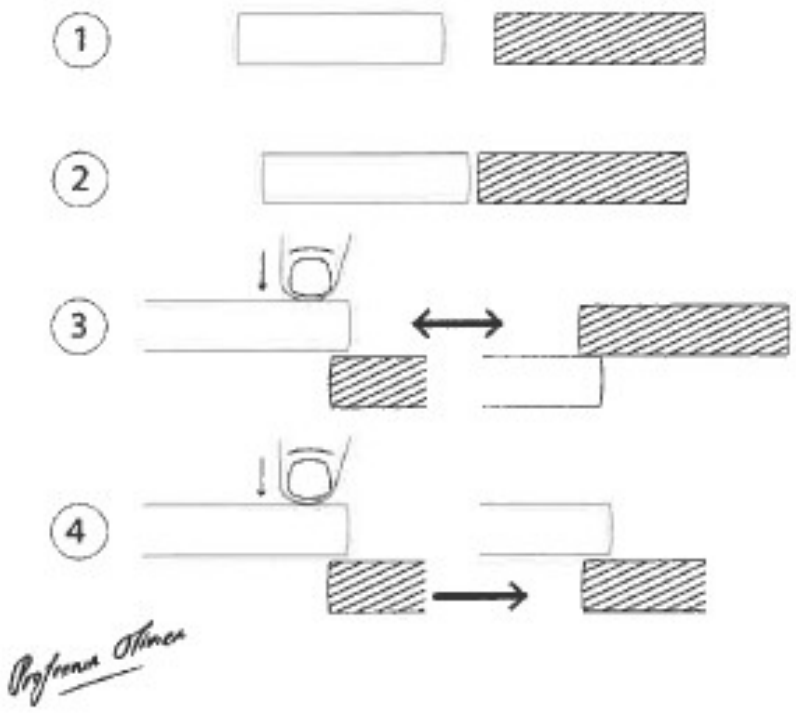
Stage 1 = **Absence of moulding**, and on palpation of the foetus' skull you can feel the depression of the sagittal suture.

Stage 2 = **Moderate moulding**: the parietal bones touch, the sagittal suture is difficult to feel on palpation.

Stage 3 = **Significant moulding**: the parietal bones overlap, and the **overlap can be reduced**. You can feel a change in level on the surface of the skull and, when you press on this level change, the level change inverts.

Stage 4 = **Significant moulding**: the parietal bones overlap, and the **overlap cannot be reduced**. You can feel a change in level on the surface of the skull and, when you press on this level change, it remains unchanged (Figure n°16).

FIGURE N°16



Moulding of the skull

In situation n°3:

- the overlap can be reduced
- the pressure with the finger on the bone plate passes the plate that was on top, down, and the one that was underneath, up.

In situation n°4:

- the overlap cannot be reduced
- the pressure with the finger does not make it possible to reduce the overlap, despite the pressure from the finger and the bone plates do not move

Question 24

Is there a type of moulding that can be detected on clinical examination and that contraindicates all operative vaginal deliveries?

Yes, there is a type of moulding that can be detected on clinical examination and that contraindicates operative vaginal deliveries.

If the sutures overlap, this is an absolute contraindication for any form of operative vaginal delivery.

Stages 3 and 4 of moulding contraindicate all forms of operative vaginal delivery.

Question 25

When a radio-pelvimetry is available, that is, measurements of the bone diameters of the pelvis, is there maximum moulding that is authorised?

And, if yes, what is it?

Yes, there is a case in which the expected moulding is such that it contraindicates any form of vaginal delivery of a foetus presenting head-first.

In certain rare cases, the woman has had a scan of her pelvis and the obstetrician has measurements of the diameter of the pelvis.

During childbirth, when the foetus presents head-first (so called cephalic presentation), we consider that acceptable moulding is up to 10 millimetres, that is, that the biparietal diameter of the foetus (BPD) is compatible with vaginal delivery as long as the value of the foetus' BPD is equal to or at most 10 mm more than the values of each of the diameters of the pelvic canal.

Here are several examples:

Case 1 BPD of 100 mm and canal that is 110 mm in diameter:

- No moulding necessary (the head will pass)

- Vaginal delivery authorised

Case 2 BPD of 100 mm and canal that is 100 mm in diameter:

- No moulding necessary

- Vaginal delivery authorised

Case 3 BPD of 100 mm and canal that is 95 mm in diameter:

- Moulding necessary = 100-95 mm = 5 mm

- Vaginal delivery authorised (moulding < 10 mm)

Case 4 BPD of 100 mm and canal that is 89 mm in diameter:

- Moulding necessary = 100-89 mm = 11 mm (moulding > 10 mm)

- Vaginal delivery contraindicated, perform a caesarean

Note: When the foetus presents buttocks first or cross-legged (breech presentation), additional safety conditions apply, with a maximum biparietal diameter of 98 mm and no moulding tolerated. The value of the BPD must always be less than or at a maximum must be equal to each of the diameters of the pelvic canal.

Question 26

What is the caput succedaneum, and how do you diagnose it?

(Figures n°10 and n°17)

Each bone in the foetus' skull is limited by the periosteum, all the bones in the skull are covered by a thick aponeurosis called the "galea aponeurotica", itself covered by the scalp, composed of epidermis and hypodermis (Figure n°10).

If the foetus' head is too large in relation to the mother's pelvis, the skull is compressed, the bones of the skull and galea aponeurotica will rub against the pelvis. If there is significant rubbing it can lead to the formation of a bump, that is, the production of a serous discharge and blood into the scalp above the galea aponeurotica. The longer this goes on, the larger the bump will be (Figure n°17).

During any childbirth, and particularly during any delivery, during the vaginal examination, it is necessary to palpate the bones of the skull of the foetus with the fingertips of the index and middle fingers, and try to find a caput succedaneum. When there is no caput succedaneum, the doctor's fingers will find, as soon as they are in contact with the foetus' scalp, the bones of the skull that form a hard surface.

When there is a bump, the finger will first find the foetus' scalp, and then a soft mass that is elastic. This is the caput succedaneum. The hard foetal skull is difficult to feel under this bump. It is very important to press the bump sufficiently with the fingertip to make contact with the foetus' skull, which can always be felt beneath the bump.

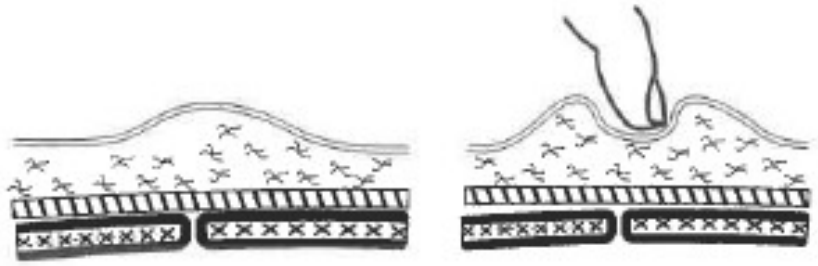
When there is a bump, it is indicative of a disproportion between the foetus' head and the mother's pelvis, and it is necessary to be particularly prudent.

If there is a bump, but it is small in size, it is preferable to perform a forceps delivery rather than a ventouse delivery, but in all cases, the safety rules must be respected scrupulously.

(Figure n°17).

FIGURE N°17

Situation A: no caput succedaneum



Situation B: caput succedaneum

Hypodermis

Galea

Bone

Situation A:
The finger touches the skin on the skull and the skull bone almost at the same time

Situation B:
The hypodermis is infiltrated by serum and blood. The finger sinks into the soft bump before reaching the hardness of the foetal skull

Question 27

Cite the different stages in the caput succedaneum.

Stage 1: no caput succedaneum

Stage 2: bump with a thickness of less than 2 cm

Stage 3: bump with a thickness of 2 to 3 cm

Stage 4: bump with a thickness of more than 3 cm

Question 28

Is there a type of caput succedaneum that contraindicates operative vaginal deliveries?

Yes, there is a type of caput succedaneum that contraindicates operative vaginal deliveries.

Stage 3 cases (bumps 2 to 3 cm thick) contraindicate the use of the ventouse. Forceps can be used if the safety rules are respected.

In stage 4 cases, that is, if the bump measures more than 3 cm in thickness, the contraindication for an operative vaginal delivery must be discussed.

Question 29

Is there a simple and reliable way to diagnose a caput succedaneum?

(Figure n°18)

Yes.

The transperineal ultrasound makes it possible in a couple of seconds to see whether there is a bump or not, and to measure its thickness.

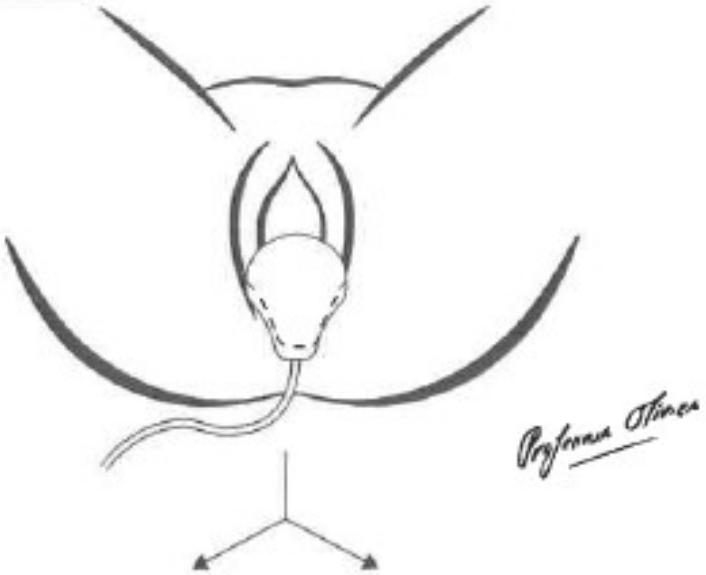
All you need to do is place an abdominal ultrasound probe, protected by a sterile glove, on the patient's perineum.

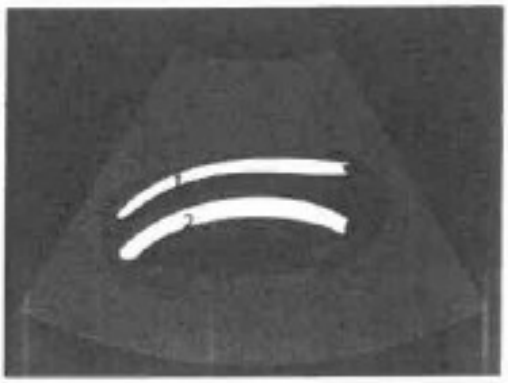
The probe is placed horizontally (Figure n°2), that is, perpendicular to the plane of symmetry of the mother (Figure n°1). All that is then needed is to measure the distance between the ultrasound of the foetus' skull and that of the scalp.

These two ultrasounds are easily visible in the form of two white arcs, each measuring a few millimetres in thickness and separated by less than 5 mm. The distance between the 2 white lines is the thickness of the bump.

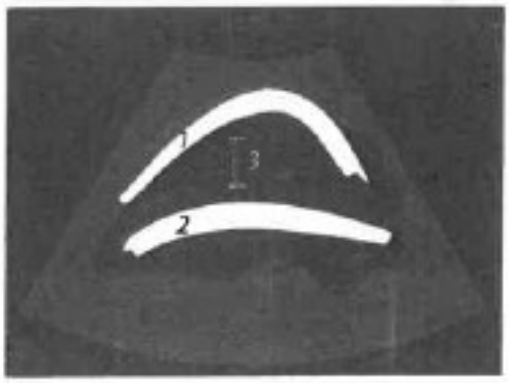
(Figure n°18)

FIGURE N°18





No caput succedaneum



Caput succedaneum
3 = thickness of the bump

1. white arc = scalp
2. white arc = skull of the foetus
3. thickness of the caput succedaneum

Question 30

Is the absence of diagnosis of a caput succedaneum dangerous? Why?

(Figure n°19)

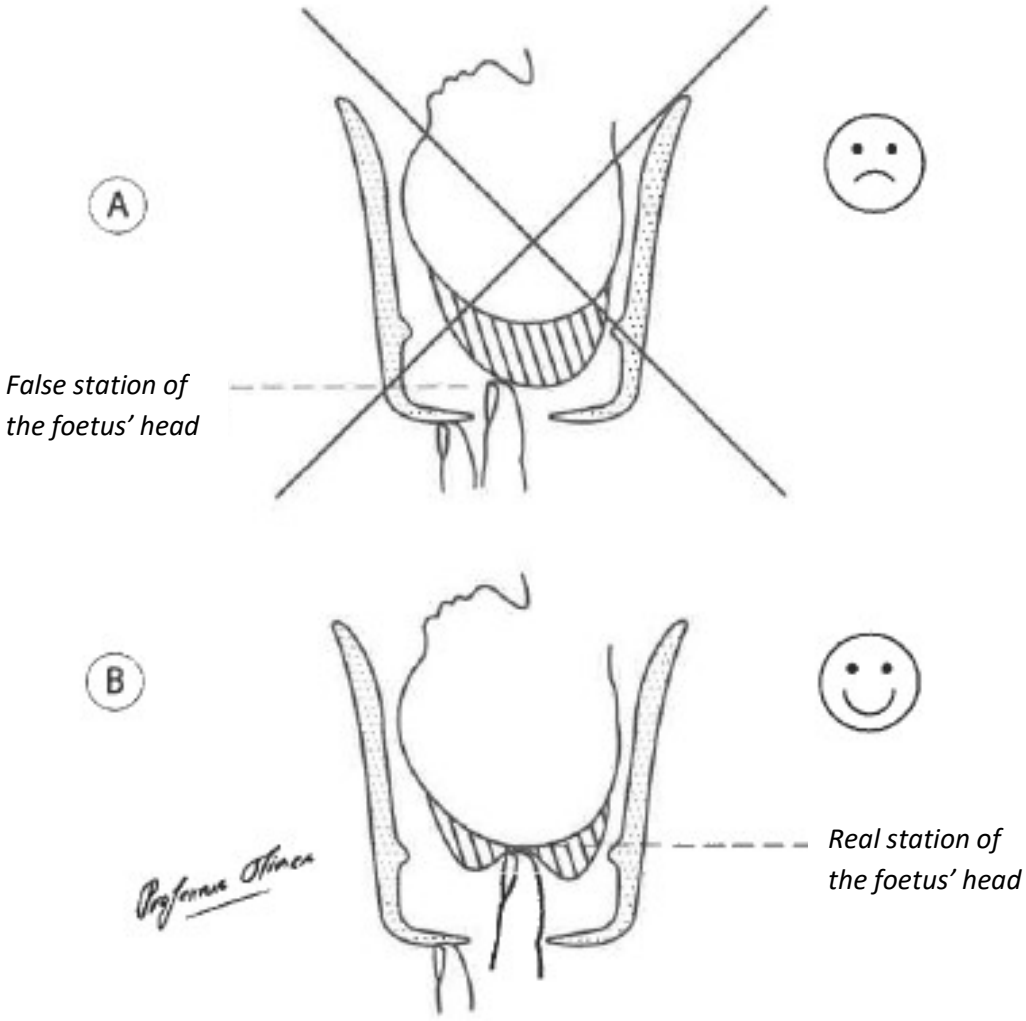
Yes, the absence of diagnosis of a caput succedaneum is dangerous.

When there is significant cephalopelvic disproportion, the skull effectively gets stuck in the pelvis, and then the bump forms. As it increases in thickness, it will give the false impression that there is descent of the foetus' head when in reality the foetus' skull is immobile, blocked in the pelvis, with only the bump "descending".

Failure to diagnosis a caput succedaneum is thus a dangerous situation (Figure n°19).

During the vaginal examination, the pressure exerted by the finger on the foetus' head must be strong enough to reach the foetus' skull (situation B in Figure n°19). If the pressure exerted by the finger is not strong enough, the obstetrician is in the dangerous situation represented in situation A in Figure n°19.

FIGURE N°19



A – Bump non diagnosed = danger++
B – Bump diagnosed

Question 31

What is asynclitism of the foetal head?

The following figure shows at the top (situation A) a foetal head without asynclitism and at the bottom two situations of asynclitism (situation B and situation C).

Name these types of asynclitism, then indicate how to diagnose them.

(Figure n°20)

In situation “A” in Figure 20, there is no asynclitism.

The plane of symmetry of the mother’s body, and the plane of symmetry of the foetus’ head coincide.

When there is foetopelvic disproportion, the foetus stuck in the pelvic canal behaves like an adult who wants to fit their head between two bars: it tilts its head to the right and then to the left. In this case, the head is no longer centred in the pelvic canal, and the foetal plane of symmetry is no longer in line with that of the mother.

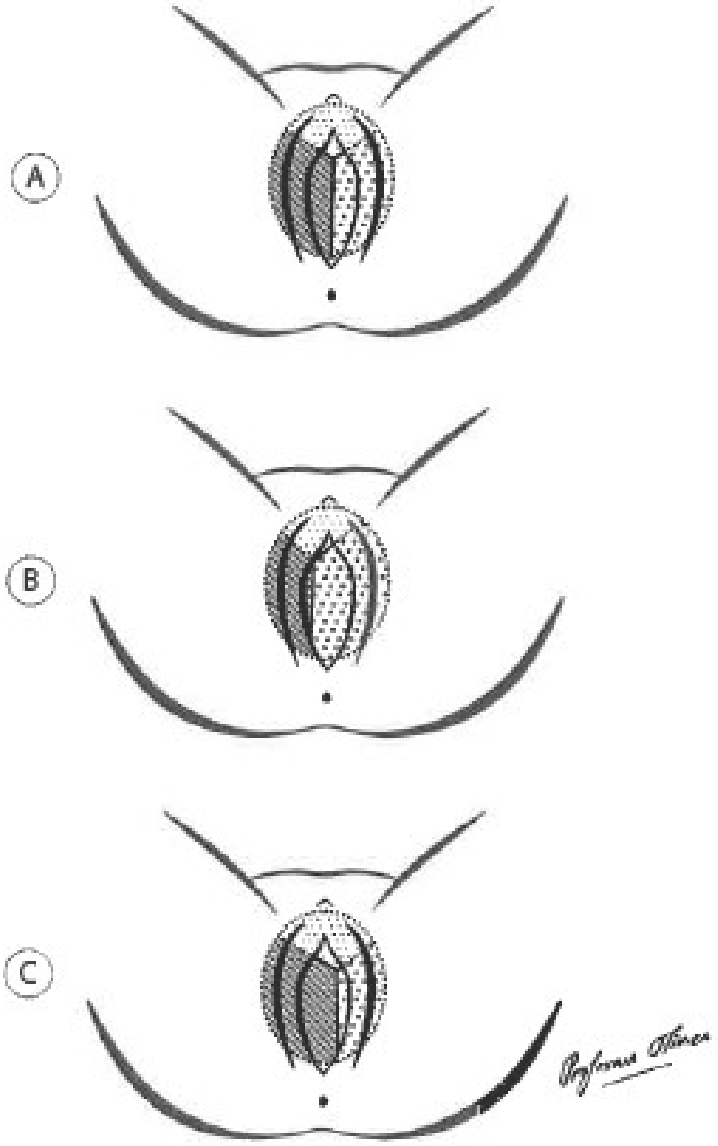
When the sagittal suture is off-centre towards the **obstetric right**, it is referred to as **right asynclitism**: situation B in Figure n°20.

When the sagittal suture is off-centre towards the **obstetric left**, it is referred to as **left asynclitism**: situation C in Figure n°20.

The diagnosis is made via the vaginal examination, by comparing the respective positions of the sagittal suture in relation to the mother’s plane of symmetry (Figure n°1).

Note: Figure n°20 shows a variety of the OA type; in a variety in “occiput posterior”, we can also have three situations: no asynclitism, right asynclitism or left asynclitism.

FIGURE N°20



Question 32

Carefully look at the head of the foetus in case A in Figure 21 and observe situations B and C.

What can you see?

What do you call these examples of asynclitism and how do you diagnose them?

(Figure n°21)

In Figure n°21, we can see three situations:

In situation A, the head is in the centre of the pelvis and there is **no asynclitism**.

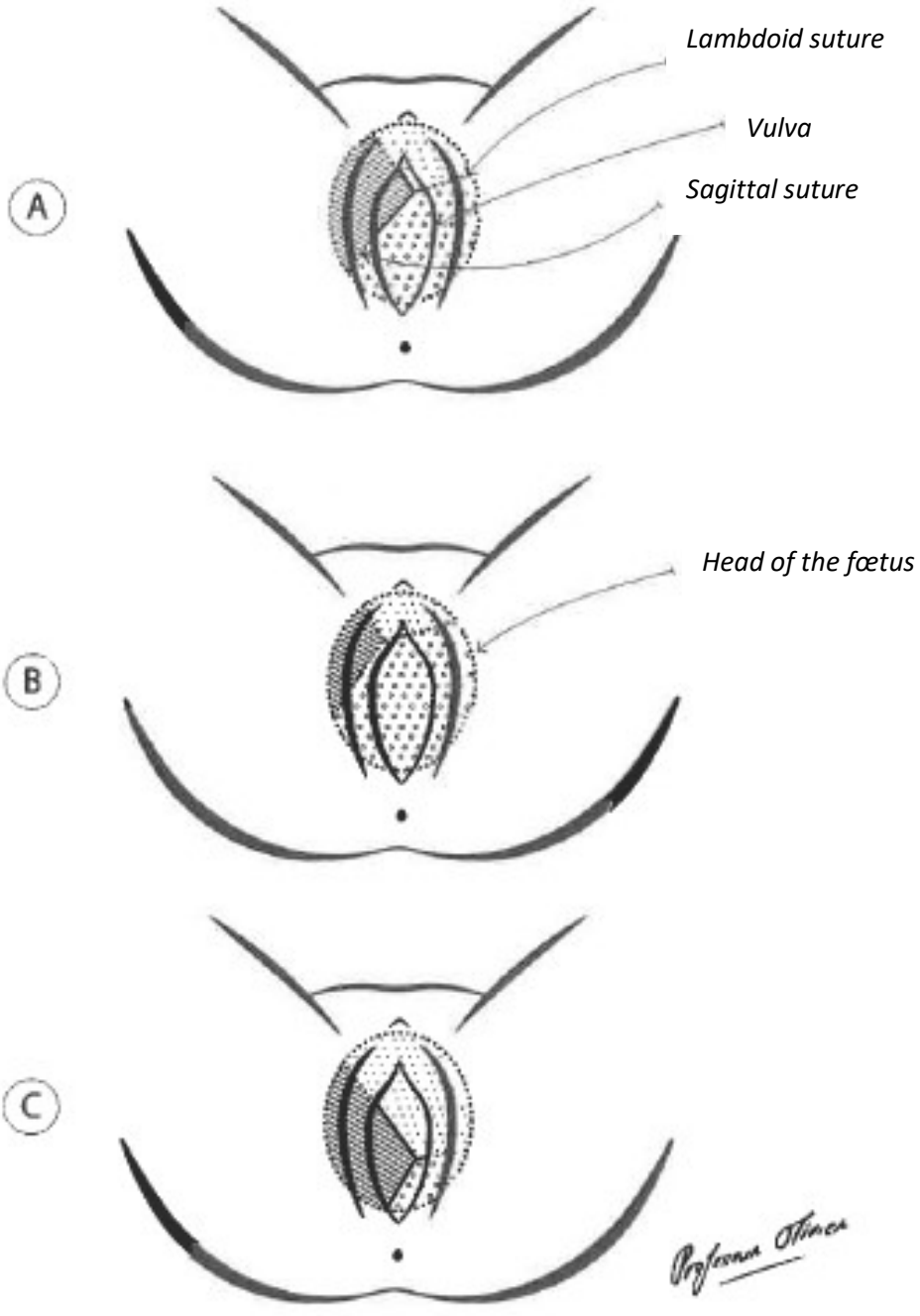
In situation B, the foetus has tilted its head towards the mother's pubis, this is a so called **"anterior" asynclitism**: the sagittal suture is positioned closer to the mother's pubis.

In situation C, the foetus has tilted its head towards the mother's anus, this is a so called **"posterior" asynclitism**:

Diagnosis of these forms of asynclitism is made during the vaginal examination by palpating the sagittal suture and looking to see if it is centred on the axis of the pelvis, or instead tilted towards the pubis or the anus.

Note: this figure represents a variety of the LOA type, in another oblique variety of the ROP, ROA or LOP type, we can also observe asynclitism that can be either "anterior" or "posterior".

FIGURE N°21


Lambdoid suture
Vulva
Sagittal suture
A
Head of the fœtus
B
C

Question 33

Cite the different stages of asynclitism.

Stage 1: No asynclitism.

Stage 2: Asynclitism of strictly less than 2 cm. The sagittal suture is less than 2 cm off the axis of the pelvis.

Stage 3: Asynclitism of 2 cm or more. The sagittal suture is more than 2 cm off the axis of the pelvis.

To our knowledge, to date, no studies have been carried out on this subject: this notion of “the stages of asynclitism” is thus, in 2024, theoretical.

Question 34

Does the discovery of asynclitism contraindicate an operative vaginal delivery?

Justify your answer.

No. Asynclitism is not a contraindication for operative vaginal delivery, but asynclitism will make positioning the instrument, whether ventouse or forceps, more difficult.

In this case, the delivery is best performed by a senior obstetrician.

As asynclitism indicates cephalopelvic disproportion, it is necessary to be prudent and to strictly respect the rules of safety that cover operative vaginal deliveries.

If three successive tractions do not move the head forward, you must abandon the vaginal delivery and perform a caesarean.

Question 35

Exercise 7

Note on the following page the three signs of cephalopelvic disproportion that can be identified on clinical examination of the foetus' head.

The three signs of cephalopelvic disproportion that can be found by examining the foetus' head are:

A: ……..

B: ……..

C: ……..

(Answer: see page 412)

Question 36

We have just seen (questions 21 to 35) that in a foetus, three signs of cephalopelvic disproportion can be present on the head, and they are:

- the caput succedaneum, moulding and asynclitism.

Let us now focus on the mother.

What is the single most important sign of foetopelvic disproportion in the mother?

In the mother, the single most important sign of foetopelvic disproportion is the slowness of the progression of labour, that is, the cervix dilates very slowly, and the head of the foetus stops descending, or descends very slowly, at the cost of deformation through moulding, a bump, or asynclitism.

It is very important to understand that if you wait long enough, almost every woman will reach full dilation of her cervix.

It is therefore not achieving full dilation that is a sign that there is no foetopelvic disproportion,

but ***the speed at which full dilation was attained and the speed at which the foetus descends until birth that matters.***

Question 37

Concept of Predicted Delivery Time (PDT).

The predicted delivery time or PDT is a concept that I have invented and that I have used for several years to try to estimate the intensity of the risk of foetopelvic disproportion.

The concept is simple: if the foetus has a weight and position that are compatible with the mother's pelvis, it will progress regularly through the pelvic canal.

On the contrary, if the weight or position are not adapted to the pelvic canal, the progression of the foetus will be slower. Many studies have analysed the average duration of the foetus' progression.

Most studies have shown that during labour, after reaching 4 or 5 cm of dilation, the labour progresses at a relatively fixed rhythm. Thus, if we know at what time the patient reached 4 cm of dilation, we can estimate a predicted delivery time.

The PDT is the Predicted Delivery Time, that is, the time at which the patient should have given birth if the labour progresses with no significant disproportion.

By comparing the actual time at which we are called for an instrument delivery to the PDT, we can thus, before performing the delivery, verify if we are "ahead of the PDT", indicating a risk of foetopelvic disproportion that is low, or if we are "behind the PDT", indicating a high risk of foetopelvic disproportion.

This concept of PDT can easily be explained to pregnant women, which makes it possible to reassure them by giving them a "time marker" that will help decrease their anxiety and reinforce the trust-based relationship that is essential in every delivery.

Question 38

To be able to estimate the Predicted Delivery Time of a woman in labour, you need three pieces of information.

What are they?

To estimate the PDT, you need the three following pieces of information:

1. You need to know the labouring woman's "vaginal parity".

Note: this does not mean the parity, but the "vaginal parity", that is, the number of children that the mother has already given birth to vaginally (See question n°15).

2. You need to know if locoregional analgesia of the epidural type (EA) has been put in place.

Effectively, as reported in the analysis in the *Cochrane*, it has been shown that putting in place locoregional analgesia such as an epidural significantly increases the duration of the second phase of labour, that is, the duration between the time when the woman arrives at full dilation and the time of the birth[37].

3. You need to know what time the woman attained dilation of 4 cm.

Question 39

In terms of the duration of the first and second phases of labour, what are the two hypotheses that we can make to estimate the predicted delivery time (PDT)?

Two hypotheses need to be made:

1. The first hypothesis concerns the duration of the active phase of the first phase of labour:

"From 4 cm of dilation of the cervix to full dilation, the duration of the dilation of the cervix is 1 cm per hour, that is, a maximum of 6 hours to go from 4 cm to full dilation." (see Question n°17)

2. **The second hypothesis concerns the duration of the second phase of labour** (see Question n°18) **and is based on the American definition of the duration of this second phase.**

There are four possibilities:

- **In a vaginal nulliparous patient with EA: maximum 3 hours**
- **In a vaginal nulliparous patient without EA: maximum 2 hours**
- **In a vaginal multiparous patient with EA: maximum 2 hours**
- **In a vaginal multiparous patient without EA: maximum 1 hour**

Question 40

In practice, explain the different stages that are going to allow you to estimate the Predicted Delivery Time (PDT).

Know how to give the four rules that will make it possible to estimate the PDT in relation to the patient's situation.

FIRST STAGE

- Consult the partograph and look at what time the patient reached 4cm of dilation or, if the partograph is not available, ask the person monitoring the labour at what time the patient reached 4 cm of dilation **(start of the active phase of the first phase of labour).**

We refer to this as time X.

SECOND STAGE

Know if the patient has already given birth vaginally, or if this is her first vaginal delivery.

THIRD STAGE

Use the rule that corresponds to the situation of this parturient:

- If it is a vaginal nulliparous patient with epidural analgesia (EA):

To the 6 hours of the active phase of the first phase of labour, you need to add the 3 hours until full dilation, and you thus obtain the **rule of 9 hours.**

That is, the Predicted Delivery Time is 9 hours after the time at which the patient was at 4 cm, so PDT = time X + 9 hours;

- If it is a vaginal nulliparous patient without EA:

To the 6 hours of the active phase of the first phase of labour, you need to add the 2 hours until full dilation, you obtain the **rule of 8 hours.**

That is, the Predicted Delivery Time is 8 hours after the time at which the patient was at 4 cm, so PDT = time X + 8 hours;

- If it is a vaginal multiparous patient with EA:

To the 6 hours of the active phase of the first phase of labour, you need to add the 2 hours until full dilation, you obtain the **rule of 8 hours.**

That is, the Predicted Delivery Time is 8 hours after the time at which the patient was at 4 cm, so PDT = time X + 8 hours;

- If it is a vaginal multiparous patient without EA:

To the 6 hours of the active phase of the first phase of labour, you need to add the 1 hour until full dilation, you obtain the **rule of 7 hours.**

That is, the Predicted Delivery Time is 7 hours after the time at which the patient was at 4 cm, so PDT = time X + 7 hours.

Question 41

You are the on-call obstetrician. You are called for an operative vaginal delivery and you are familiar with the concept of Predicted Delivery Time.

Depending on the speed of progression of the foetus in the mother's pelvis, and depending on the PDT, the mother is obligatorily, in terms of time, in one of the three following situations:

What are they?

Situation A: The pelvis is adapted to the foetus; the foetus is well positioned and is not too large. The resistance to the progression of the foetus is low, the child has thus descended rapidly into the pelvis.

The situation is that of "**Ahead of the PDT**".

Situation B: The pelvis and the foetus are adapted to each other; the child has descended at a normal rate. The situation is that of "**Respected PDT".**

Situation C: The pelvis and the foetus are not adapted to each other, either the child is too big, or the child is poorly positioned (lying on its back or head deflected), or the pelvis is too small, or the resistance of the soft areas is too great… In this case, the child descends with difficulty into the pelvic canal.

The situation is that of a "**Delay to the PDT".**

Question 42

Now that you are familiar with the concept of Predicted Delivery Time (PDT), indicate what is THE sign of foetopelvic disproportion that must systematically be screened for in the mother before performing an operative vaginal delivery?

The sign to be screened for is the delay to the predicted delivery time, the so-called "Delay to the PDT".

In cases of foetopelvic disproportion, the birth can be slowed down, the dilation of the cervix and the descent of the baby can be laborious. The situation is that of a delay to the Predicted Delivery Time.

Before performing an instrument delivery, you must:

1. **Estimate the PDT using the technique mentioned above (Question n°38);**

2. **Compare the PDT to the current time;**

3. **If the situation is that of a "Delay to the PDT", reflect seriously on the high risk of foetopelvic disproportion.**

Question 43

What is the link between the three possible situations in relation to the PDT and the risk of foetopelvic disproportion?

There are three situations:

1. Situation of being **ahead of the PDT: low risk** of foetopelvic disproportion.

2. Situation of a **respected PDT: moderate risk** of foetopelvic disproportion.

3. Situation of **delay to the PDT: high risk** of foetopelvic disproportion.

Question 44

Exercise 8

You are the on-call obstetrician and at midday you are called to the labour ward to perform an operative vaginal delivery on Ms N.

You have the following information: this is a first pregnancy for Ms N.;

Ms N. attained dilation of 4 cm at midnight the night before; epidural analgesia was put in place at 11 pm the night before.

- What is the PDT?

- Is the risk of foetopelvic disproportion low, moderate, or high?

- Can an operative vaginal delivery be performed? Justify your answer.

(Answer: see pages 107 and 412)

……

……

……

……

A. ESTIMATION OF THE PDT (Predicted Delivery Time):

From 4 cm to 10 cm = 6 hours.

From full dilation (in a vaginal nulliparous patient with EA) to birth = 3 hours.

Total of 4 cm till birth = 9 hours (so-called rule of 9 hours).

PDT = midnight + 9 hours = 9 am

B. ESTIMATION OF THE RISK OF FPD (foetopelvic disproportion):

It is midday (12 pm) when you get the call.

The PDT was 9 am. In relation to the PDT, you are in a situation of "delay to the PDT", 12 pm - 9 am = 3 hours. Thus there is a **high risk of FPD**.

C. SHOULD AN OPERATIVE VAGINAL DELIVERY BE PERFORMED?

The delay to the PDT is not an absolute contraindication to an operative vaginal delivery, but it makes it possible to estimate that the situation may be linked to FPD. This situation thus imposes the very greatest precaution and screening for the signs of FPD in the foetus.

There are two possibilities:

- There is moulding, with overlap of the sutures of the foetus' skull or a caput succedaneum that is large; in this case, a caesarean will be performed.

- If there is no significant moulding, and no significant bump, a forceps or ventouse delivery can be envisaged. It may effectively be a delay linked to a lack of uterine contractions or the membrane of the amniotic sac has not ruptured or there is a distended bladder that has not been noticed… In this case, you should strictly respect the rules for use that will be described below, and in particular perform the maximum three tractions. In the absence of progression after 3 tractions, the attempt at an instrument delivery should be abandoned.

Question 45

Exercise 9

You are the on-call obstetrician and at 7 pm you are called to the labour ward to perform an operative vaginal delivery on Ms N.

You have the following information: this is the second vaginal delivery for Ms N; Ms N. was at 4 cm of dilation at 3 pm. Epidural analgesia was put in place at 4 pm.

- What is the PDT?

- Is the risk of foetopelvic disproportion low, moderate, or high?

- Can an operative vaginal delivery be performed? Justify your answer.

(Answer: see pages 109 and 412).

A. ESTIMATION OF THE PDT

From 4 cm to 10 cm = 6 hours

From full dilation in a woman who has already given birth vaginally and who has EA in place to birth = 2 hours.

Total from 4 cm till birth = 8 hours (rule of 8 hours).

PDT = 3 pm + 8h = 11 pm

B. ESTIMATION OF THE RISK OF FPD

It is 7 pm when you get the call. The PDT is at 11 pm. The situation is that of being **4 hours ahead of the PDT,** there is thus a **low risk of FPD.**

C. SHOULD AN OPERATIVE VAGINAL DELIVERY BE PERFORMED?

When the situation is that of being **"ahead of the PDT",** the risk of foetopelvic disproportion is minimal, and delivery can be performed safely if necessary (empty bladder and reasonable time taken to full dilation).

Question 46

Another piece of information that is liable, at least relatively speaking, to contraindicate an operative vaginal delivery, can be found in the pregnancy file before performing an instrument delivery. What is it?

This piece of information is the **estimation of the foetus' weight**. This is best obtained in the month preceding full term thanks to Hadlock's formula using the measurements of the biparietal diameter, the cephalic circumference, the abdominal circumference, and the length of the femur[39].

It should be remembered **that for estimates of more than 4500 grammes for a diabetic pregnant woman, and estimates of more than 5000 grammes for a non-diabetic pregnant woman, a caesarean can be discussed, particularly as a preventive measure against the risk of shoulder dystocia.**

Note: remember that real shoulder dystocia can occur even during a caesarean delivery, and that this type of caesarean requires a gentle delivery of the foetus by an experienced obstetrician.

However, it should be noted that estimates of the foetus' weight should not prejudice in favour of dystocia. Effectively, a newborn weighing 4500 grammes can very easily be born vaginally spontaneously if the pelvis of the mother is comfortable, whereas the birth of a newborn weighing 2800 grammes may require a caesarean if the mother's pelvis is narrow… The four signs of FPD that we mentioned above (asynclitism, moulding, caput succedaneum and delay to the PDT) are of much greater value that the simple estimate of the foetus' weight[40].

Question 47.

“Egg theory” concept, also known as “symmetry theory”.

(Aim: to explain this theory through a simple experiment.)

(Figures n°22 and n°23)

In this theory[1], I compare the foetus' head to an egg that you are holding in the palm of your hand.

Hold an egg in the palm of your hand and squeeze it, applying symmetrical mechanical force to the sides of the egg.

What happens?

The egg does not break, and you realise that you can apply mechanical force of great intensity without breaking it (Figure n°22).

On the contrary, if you apply to the surface of the egg mechanical force of lower intensity, but this force is applied asymmetrically, you will break the eggshell (Figure n°23).

By carrying out this experiment, you can easily understand that **it is not only the amount of mechanical force applied to the foetus' head that is dangerous, but that it is the quality of this force, that is, its more or less symmetrical nature, that is important.**

Asymmetrical force, even of low intensity, can be dangerous, while force of great intensity applied symmetrically is less dangerous.

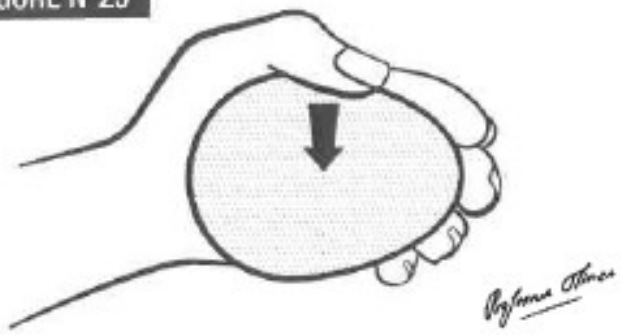
This theory shows that for each delivery operators must force themselves to do everything possible to apply mechanical force of the "symmetrical" type to the head of the foetus. This symmetry theory makes it possible to describe three key, successive stages that operators must perform at each instrument delivery.

This approach makes it possible to exclude most of the causes of asymmetry that can occur during childbirth. This concept applies to all deliveries, regardless of what instruments are used.

FIGURE N°22

Application of symmetrical forces → the egg remains intact

FIGURE N°23



Application of asymmetrical forces → the egg breaks

Question 48

During an operative vaginal delivery, what are the three stages (of symmetry theory) during which the obstetrician can produce asymmetrical force to the foetus' head?

(Figure n°24)

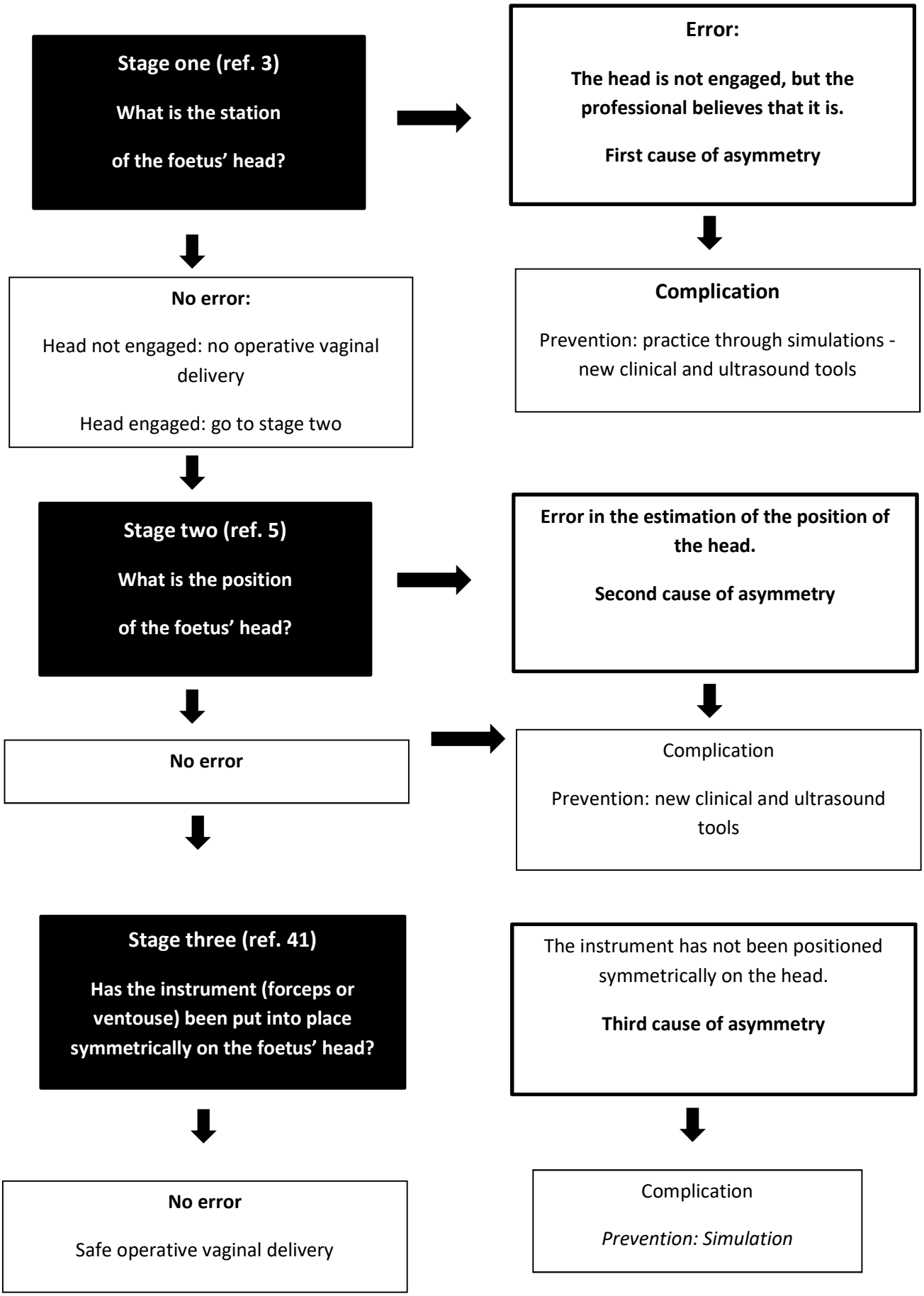
First stage: during diagnosis of the station of the foetus' head.

Second stage: during diagnosis of the position of the foetus' head.

Third stage: during positioning of the instrument.

It is necessary to understand that, at each of these three stages, asymmetrical mechanical force can occur. The success of an operative vaginal delivery requires mastery of each of these three stages.

Figure n°24 *Theory of symmetry*



Question 49

Anatomically speaking, what is the pelvis?

Give the anatomical definition of the pelvis.

Is there one or more type of pelvis?

(Figures n°25 and n°26).

The pelvis is the bony girdle that is situated between the spinal cord at the top and the lower limbs at the bottom.

There are two types of pelvis.

At the top, the greater pelvis (ie false pelvis) which resembles the upper part of a funnel (Figures n°25 and n°26). It includes the broad fan-like iliac wing, the anterior iliac spine, and the superior sacral ala.

The bottom of the funnel is represented by the arcuate lines of the ilium, that is, the line that separates the greater pelvis at the top from the lesser pelvis at the bottom.

At the bottom, the lesser pelvis (ie true pelvis) is still referred to as the “pelvis” or “bony canal” or “pelvic canal”.

This is the angled part of the funnel (Figures n°25 and n°26).

The lesser pelvis is the pelvic canal and includes the concave sacral cavity, the iliac crests below the arcuate lines, and the pubis.

FIGURE N°25

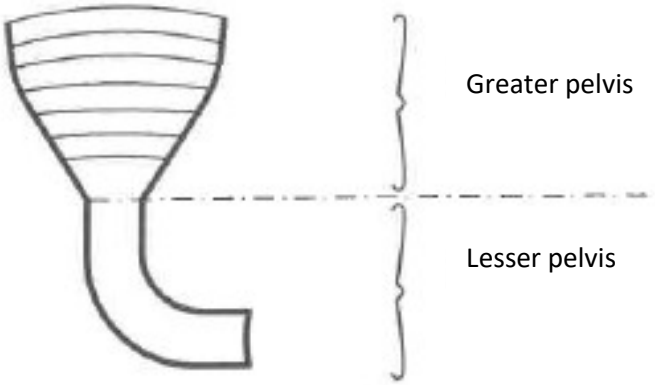
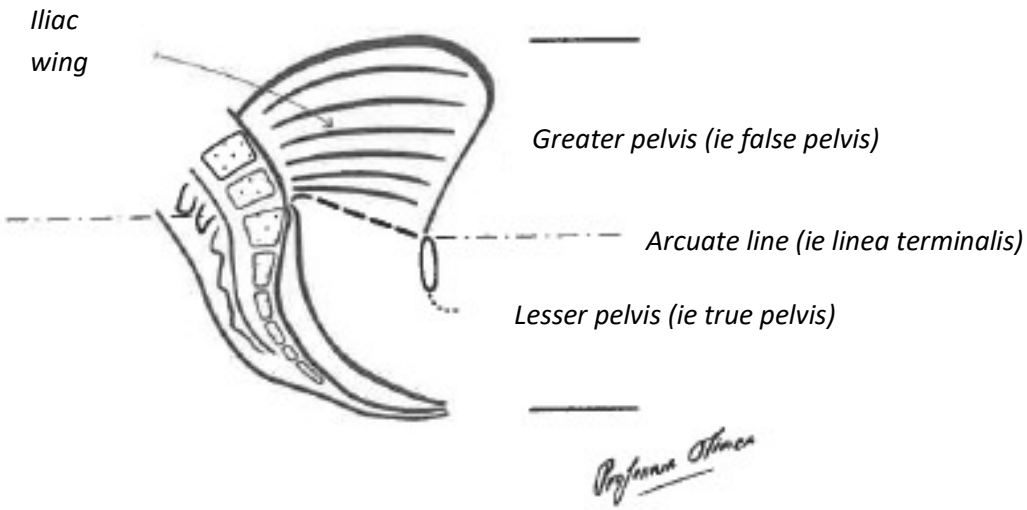


FIGURE N°26



The arcuate line (ie linea terminalis) separates the greater pelvis (ie false pelvis) from the lesser pelvis (ie true pelvis).

Question 50

Does this anatomical notion of greater and lesser pelvis have any importance or clinical significance?

If yes, what?

Yes, this anatomical notion of greater and lesser pelvis is important and has clinical significance.

During childbirth, the foetus' head will pass first through the greater pelvis, then the lesser pelvis.

The passage from the greater to the lesser pelvis is called "engagement".

The head, which was free and practically not subject to foetopelvic disproportion when it was in the greater pelvis, will become compressed between the walls of the pelvic canal when it moves into the lesser pelvis (Figures n°25 and 26). Engagement corresponds to a certain station of the head in the pelvic canal.

By definition, the presentation is referred to as "engaged" when its greatest diameter, that is, when the plane passing through the two parietal bumps (ie the biparietal diameter) has gone through the area of the upper strait (ie pelvic inlet).

It is important to note that when the largest diameter of presentation is found at the level of the upper strait, its lowest point, that is, the extremity the most advanced on the foetus' skull reaches the line that goes through both ischial spines.

The notion of engagement is essential. Once the presentation is "engaged", a vaginal delivery more often than not becomes possible, either with forceps ventouse or spontaneously.

On the contrary, if the presentation is "not engaged", an operative vaginal delivery is not permitted and in case of emergency, it is recommended that a caesarean be performed.

Question 51

What do we call the upper and lower limits of the bony pelvic canal (syn.: lesser pelvis)?

(Figure n°27)

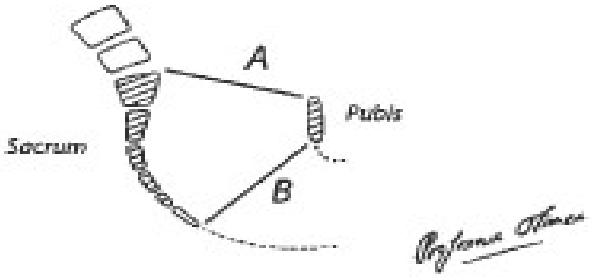
The **upper** limit of the pelvic canal is called "**the upper strait**" or **"pelvic inlet"** and is formed by:

1. at the top, there is the upper edge of the pubis;
2. on each side, there are the arcuate lines;
3. at the back, there is the sacral promontory which is the anterior edge of the lumbosacral joint.

The **lower** limit of the pelvic canal is called "**the lower strait**" or **"pelvic outlet**" and is formed by:

1. at the front, there is the lower edge of pubis;
2. on each side, the edge of the ischiopubic rami and the lower edge of the ischial tuberosities;
3. at the back, there is the lower edge of the coccyx.

FIGURE N°27



A – The upper strait = pelvic inlet

B – The lower strait = pelvic outlet

Question 52

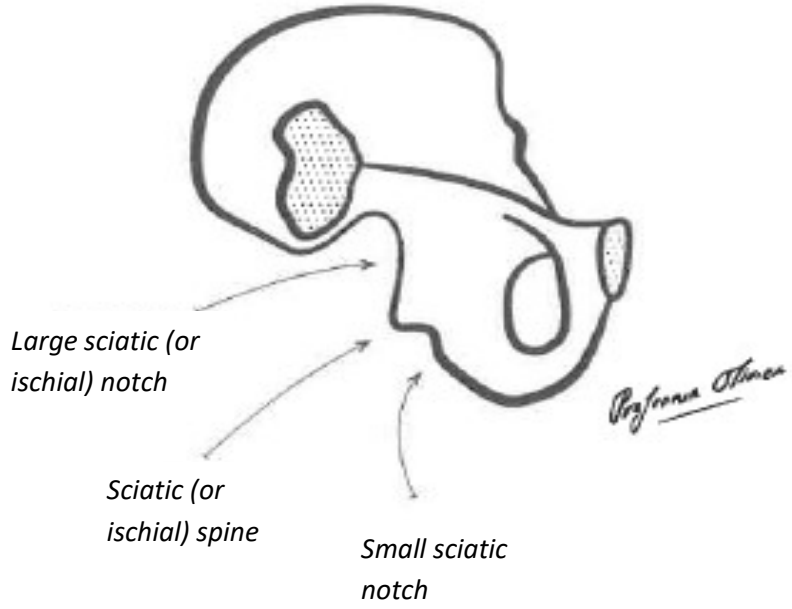
Between these two limits of the pelvic canal, is there a narrowing and, if yes, what is it composed of and what is it called?

(Figure n°28).

Yes, there is a narrowing, called “the middle strait” (ie midpelvis).

This is the plane that goes through the ischial spines, also called the ischiatic spines (Figure n°28).

FIGURE N°28



Middle strait = plane delimited by the line passing through the two sciatic spines.

Question 53

Give a definition of the curve of Carus.

(Figure n°29)

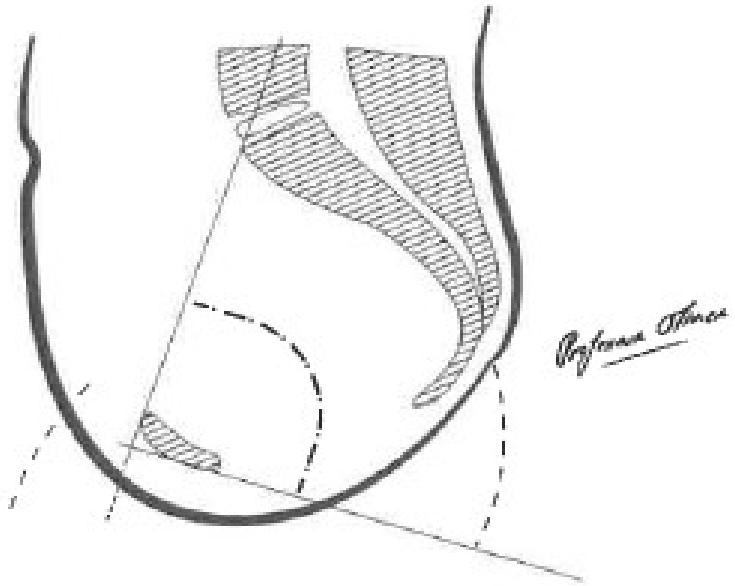
Carl Gustav Carus was born on 3 January 1789. He was a German obstetrician, botanist, and philosopher, as well as the personal physician for the King of Saxony.

He first described the curve of the pelvic canal.

The curve of Carus describes the curve of the pelvic canal. It is of major importance in obstetrics.

The pelvic canal is effectively not straight, but instead follows an incurvation of around 90 degrees between the upper strait (pelvic inlet) and the lower strait (pelvic outlet) (Figure n°29).

FIGURE N°29



The curve of Carus

Question 54

Describe the trajectory in the centre of the figure in a eutocic delivery.

In a “normal” birth, also called “eutocic”, the centre of the figure descends along the axis of the pelvis. That is, the centre of the figure follows the curve of Carus.

The ovoid of the foetus’ head tilts and presents in the pelvis via its smallest circumference. That is, via the suboccipital-bregmatic diameter (Figure n°11).

This is exactly the trajectory that must be reproduced in an operative vaginal delivery.

On the contrary, if the efforts of traction exerted with the ventouse or forceps are not applied at the level of the centre of the figure, the head will tilt, and the ovoid of the foetus’ head will present with a wider diameter in the pelvic canal. This will increase the resistance and slow down the delivery.

Question 55

Are the ischial spines (syn: ischiatic spines) of any clinical value? Why?

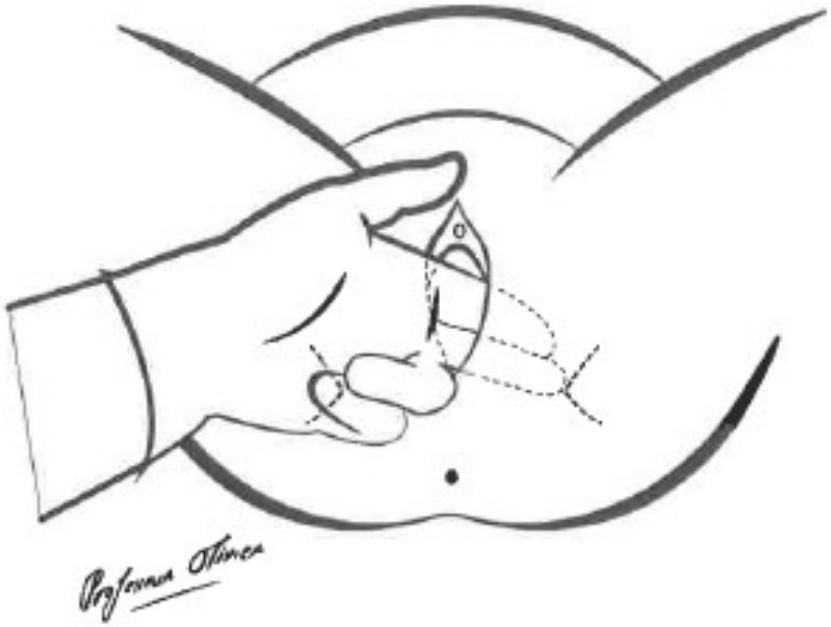
(Figure n°30)

Yes, the ischial spines are of clinical interest because they are **accessible on palpation.**

When performing a vaginal examination with the index and middle finger, you can palpate the **middle and posterior third of the vagina on each side of the plane of symmetry of the mother.**

It is important during a vaginal examination to make a habit of searching for and palpating these spines (Figure n°30).

FIGURE N°30



Palpation of the left sciatic spine
(ie ischial spine)
during the vaginal examination

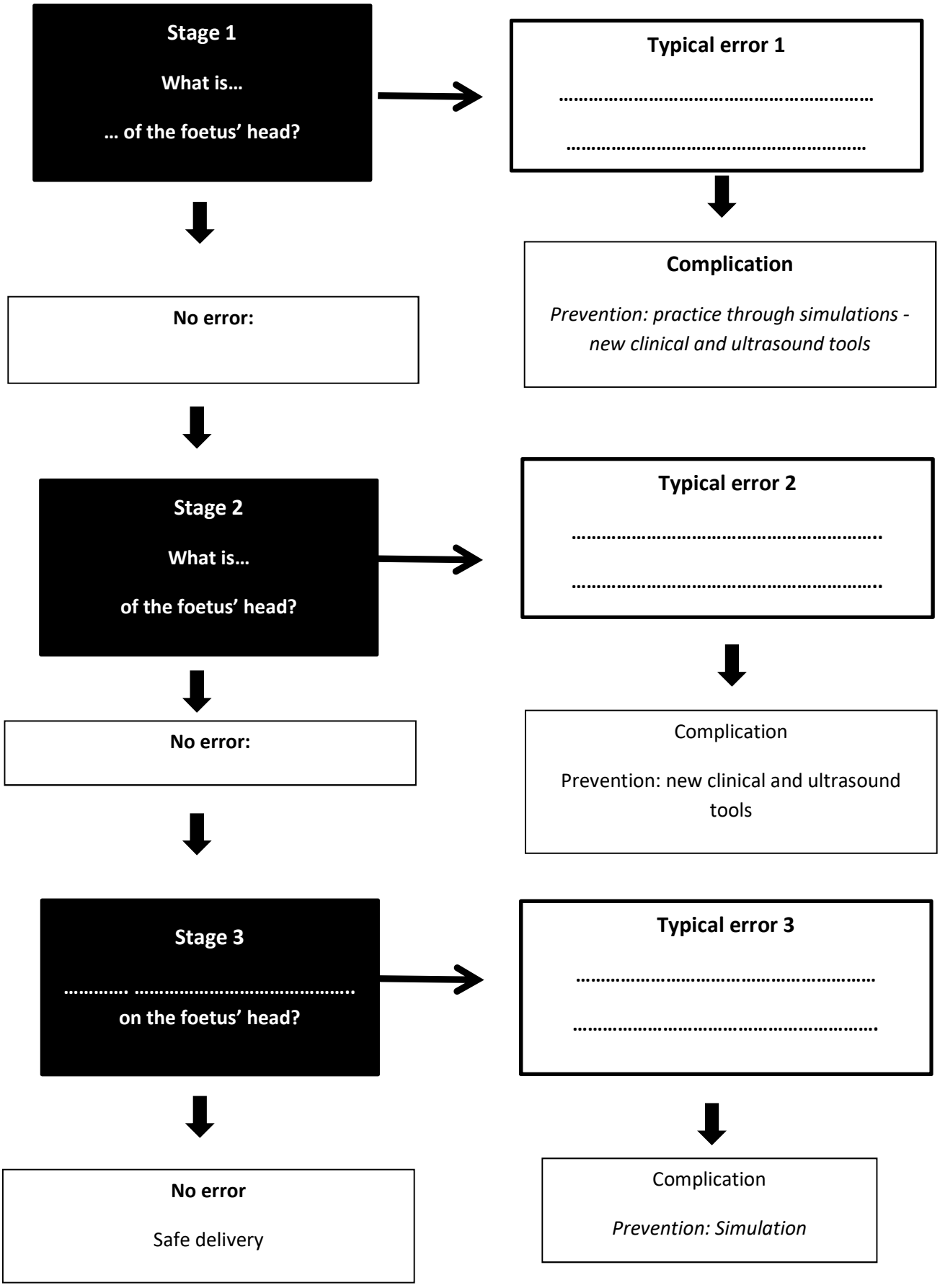
Question 56

Exercise 10

Fill in the missing text in the six boxes in Figure n°31.

(Figure n°31, answers Figure n°24)

Figure n°31 **Exercise n°10 Complete the six boxes.**



Question 57

In chronological terms, what is the first cause of asymmetrical application of mechanical force during an operative vaginal delivery (the first step in the theory of symmetry)?

The primary reason for applying asymmetrical mechanical force during an instrument delivery is an error in the appreciation of the **position of the foetus' head** in the pelvis.

Effectively, during the journey into the pelvis, the head of the foetus goes through two stages.

The first stage is the descent of the head into the greater pelvis (Figures n°25 and n°26).

The second stage is the descent of the head into the lesser pelvis. The passage from stage one to stage two defines engagement.

Sometimes, the foetopelvic disproportion is so significant that the foetus' head does not engage.

It is thus essential that any engagement problems relating to the foetus' head be diagnosed properly.

Before engagement, the head is very mobile and is not yet centred in the pelvic canal.

Positioning a delivery instrument on a *head that has not engaged* thus runs the risk of positioning it asymmetrically, and applying dangerous mechanical force. **This is the reason why non-engagement of the foetus' head is an absolute contraindication for performing an operative vaginal delivery.**

Questions 57 to 80 concern the first stage in the theory of symmetry.

Question 58

During delivery, what are the two characteristics of the anatomical marker that is chosen on the foetus' head to appreciate the station of the foetus' head?

The marker that is used on the foetus' head has two characteristics:

1. It is the **lowest** point of the foetus' head;

2. It is a point situated on the foetus' **skull** and it is not the foetus' scalp.

This is why, to avoid confusion, it is necessary to speak of the distance "foetal skull to mother's skin" (FSK to MSK) and not the distance "foetal head/vulva". The term "head to perineum distance" is not precise. It is also potentially dangerous and should be avoided.

Question 59

Can two anatomical markers be selected in the mother to estimate the station of the foetus' head? Which ones?

In the mother, we can use two markers:

- the plane that passes through the ischial spines (Figures n°28 and n°30);

- the plane of the vulva.

Question 60

Which unit of measurement is used to estimate the station of the foetus' head during childbirth?

Regardless of which maternal marker is used: the plane of the ischial spines or the plane of the vulva, the station of the foetus' head is expressed **in centimetres.**

Question 61

How long is the pelvic canal (syn.: pelvis, syn.: bony canal) in centimetres?

The pelvic canal measures 10 cm.

This is the distance which, on the plane of symmetry of the mother, is found between the middle of the upper strait (ie pelvic inlet) and the middle of the lower strait (ie pelvic outlet). It is thus the distance that separates the sacral promontory from the plane of the vulva.

To give birth vaginally, the foetus' head will have to pass through these 10 cm.

Question 62

At what distance from the sacral promontory is the plane that passes through the ischial spines?

The plane that passes through the ischial spines **is situated 5 cm above the plane that passes through the upper strait** (sacral promontory of the pelvic inlet) and the plane that passes through the ischial spines is situated 5 cm above the plane of the lower strait (which passes through the vulva).

Question 63

Name the two methods that allow the doctor to estimate the station of the foetus' head.

We can cite:

- an old clinical method using the **vaginal examination**;

- a recent ultrasound method using a **transperineal ultrasound**.

Question 64

Describe the clinical method which makes it possible during childbirth to estimate the station of the foetus' head in the mother's pelvic canal.

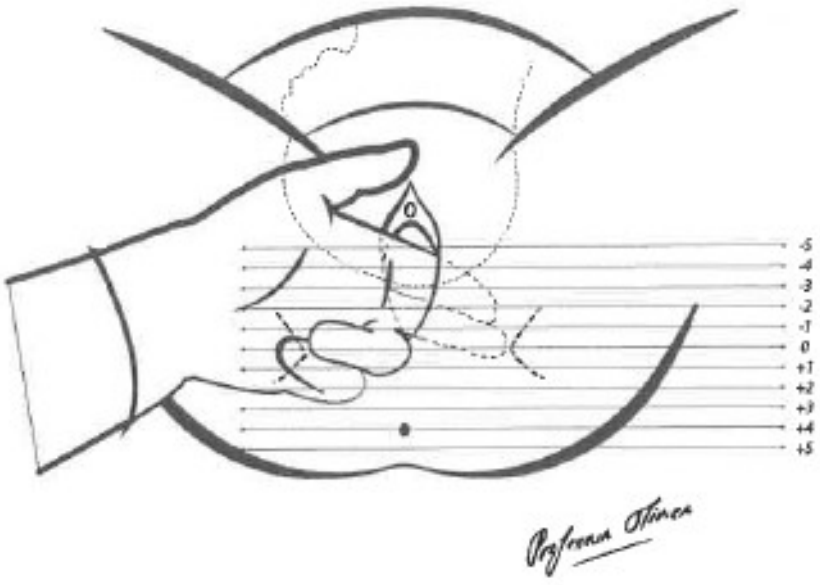
(Figures n°30 and n°32)

This method consists of performing a vaginal examination. The doctor washes their hands and puts on sterile gloves. They then perform the vaginal examination and palpate **successively with the index and middle finger the top of the foetus' skull, then either the right ischial spine on the right lateral wall of the vagina, or the left ischial spine (Figure n°30).**

The operator will then estimate mentally the distance there is between the top of the skull and the line that joins the two ischial spines.

This examination is illustrated in Figure n°32, which shows the mother with the left ischial spine and in a dotted line the projection of the foetus' head.

FIGURE N°32



The eleven levels of station for the foetus' head

In this example, the head is at level "-3".

Question 65

Using the clinical method of the vaginal examination described in the previous question, how many levels are there for the station of the foetus' head?

(Figure n°32)

During childbirth, the foetus' head travels down the 10 cm separating the sacral promontory from the plane that goes through the vulva.

The clinical method of estimating the station of the foetus' head uses as its marker in the mother the line that joins the two ischial spines and which is situated anatomically half-way between the vulva and the sacral promontory. The head will successively adopt all the stations possible along these 10 cm.

For simplification purposes, considering station centimetre by centimetre was chosen.

There are thus eleven levels for the station of the foetus' head (10 cm/10), which are as follows:

- level "minus 5 cm" = when the top of the foetus' head is situated 5 cm above the plane of the ischial spines;

- level "minus 4 cm" = when the top of the foetus' head is situated 4 cm above the plane of the ischial spines;

- level "minus 3 cm" = when the top of the foetus' head is situated 3 cm above the plane of the ischial spines;

- level "minus 2 cm" = when the top of the foetus' head is situated 2 cm above the plane of the ischial spines;

- level "minus 1 cm" = when the top of the foetus' head is situated 1 cm above the plane of the ischial spines;

- level "0 cm" = when the top of the foetus' head is situated at the level of the plane that goes through the two ischial spines;

- level "plus 1 cm" = when the top of the foetus' head is situated 1 cm below the plane of the ischial spines;

- level "plus 2 cm" = when the top of the foetus' head is situated 2 cm below the plane of the ischial spines;

- level "plus 3 cm" = when the top of the foetus' head is situated 3 cm below the plane of the ischial spines;

- level "plus 4 cm" = when the top of the foetus' head is situated 4 cm below the plane of the ischial spines;

- level "plus 5 cm" = when the top of the foetus' head is situated 5 cm below the plane of the ischial spines, that is, at the level of the vulva.

Question 66

Among the eleven levels described in the previous question (question 65), to what level does “engagement” correspond?

The engagement level corresponds thus to level zero (“0”) in the method described in the previous question (Figure n°32).

Question 67

What is the classical clinical sign that makes it possible to diagnose engagement through a vaginal examination?

<u>Vaginally, it is the Farabeuf sign</u>:

- **When the presentation is high (ie unengaged):** the index and middle finger together, which perform the vaginal examination by passing right up against the pubic symphysis, reach the sacrum.

- **When the presentation is engaged**: the index and middle finger together, which perform the vaginal examination passing right up against the pubic symphysis, cannot attain the sacrum because they bump into the head of the foetus.

Question 68

The eleven levels described above in question 65 can be divided into two groups. What are they?

We can divide the eleven levels into two groups according to whether the foetus is engaged or not.

The group of so-called "high" or "unengaged" presentations includes the presentations that are at levels "-5"; "-4"; "-3"; "-2" and "-1".

The group of so-called "engaged" presentations includes the presentations that are at levels "0"; "+1"; "+2"; "+3"; "+4"; "+5".

Question 69

The so-called “engaged” presentations can be divided into three sub-groups. What are they?

The group of engaged presentations can be divided into three sub-groups:

- sub-group of so-called “**mid**” presentations = level 0 and level +1;

- sub-group of so-called “**low**” presentations = level +2 and level +3;

- sub-group of so-called “**outlet**” presentations = level +4 and level +5;

Question 70

Note that the French terms for the three sub-groups mentioned in question 69 can be confusing.

Are so-called “high” presentations in English called “high engaged presentations” in French?

The French translation is confusing. It is effectively as follows:

- sub-group of so-called “engagées **partie haute**” presentations = level 0 and level +1, or “**mid**” presentations;

- sub-group of so-called “engagées **partie moyenne**” presentations = level +2 and level +3, or “**low**” presentations;

- sub-group of so-called “engagées **partie basse**” presentations = level +4 and level +5, or “**outlet**” presentations;

Note: the term “high” in English is not translated by the term “partie haute” in French; presentations referred to as **“high” in English are “non engagées” in French**.

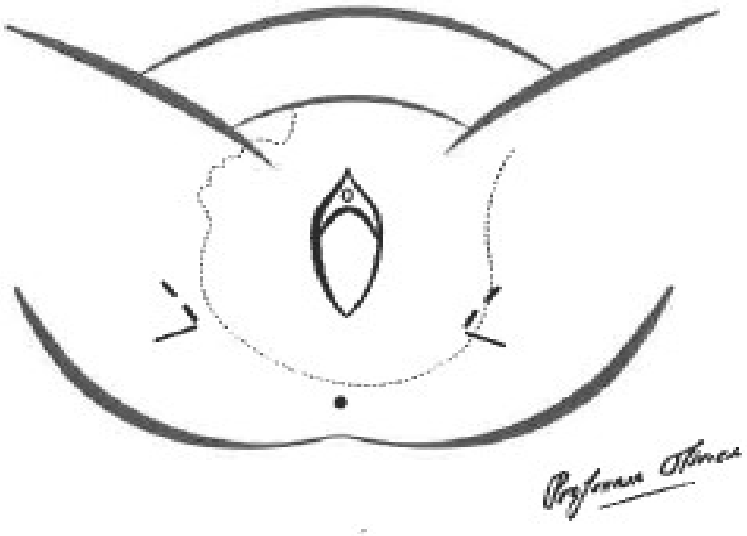
Question 71

Exercise 11

Estimate the station of the foetus' head represented in Figure n°33 in relation to the ischial spines.

(Figure n°33)

FIGURE N°33 **Exercice n°11**



Exercise n°11

What is the station of the foetus' head in relation to the sciatic spines?

(Answer: see page 412)

Question 72

You have been called to perform an operative vaginal delivery in a patient who is fully dilated and whose foetus has a normal foetal heart rate. The patient has been trying to push for 30 minutes but the foetus is no longer progressing in the pelvis. In this case, you must systematically look for two situations which, if present, will oblige you to abandon any operative vaginal delivery.

What are these two situations that you must look for?

Objective: To know how to detect two situations in which operative vaginal deliveries are not indicated.

(Figure n°34)

A. AN ABSENCE OF PROGRESSION LINKED TO INSTALLING TOO QUICKLY A PATIENT WHO IS IN A HURRY TO GIVE BIRTH

In the absence of a significant anomaly in the foetal heart rate, you can count the number of hours that have passed between the time the patient reached full dilation and the time when she started to push.

Once the cervix has reached full dilation, you must effectively leave time for the foetus to descend into the pelvis, and the pushing efforts to expulse the baby must not start too soon.

As we have already seen, the time that can be left between the time the patient reaches full dilation and the time when she starts to push depends essentially on two factors:

– the presence or absence of epidural analgesia;

– vaginal parity.

There are thus four possibilities:

- Has never given birth vaginally and has epidural analgesia:

From the time the patient reaches full dilation, it is necessary to leave 3 hours for the foetus' head to descend.

- Has never given birth vaginally and has no epidural analgesia:

From the time the patient reaches full dilation, it is necessary to leave 2 hours for the foetus' head to descend.

- Has previously given birth vaginally and has epidural analgesia:

From the time the patient reaches full dilation, it is necessary to leave 2 hours for the foetus' head to descend.

- Has previously given birth vaginally and has no epidural analgesia:

From the time the patient reaches full dilation, it is necessary to leave 1 hour for the foetus' head to descend.

Figure n°13 shows all four cases.

There are thus two possibilities:

- First possibility: the time that has passed since the patient reach full dilation is shorter than these times.

It is thus probable that the patient has started pushing too early and there is no indication for an operative vaginal delivery, you can thus wait for the time given above to pass before restarting maternal expulsive efforts.

This is important, as a Swedish team has shown[8] that the number of perineal lesions was significantly lower when the delivery did not involve instruments than when there was an instrument delivery (in this study, 97% of the deliveries involved a ventouse).

The review in the Cochrane by Lemos, A. in 2015[38] also suggested that the fact of not respecting the time between diagnosing full dilation and the start of the pushing significantly decreased the number of spontaneous vaginal deliveries. The same meta-analysis concluded that the trend was for a decrease in operative vaginal deliveries and caesareans in women who had epidural analgesia in cases of delayed pushing.[38]

- Second possibility: the time that has passed since the patient reached full dilation is longer than these times.

You can envisage an operative vaginal delivery once the following situation has been eliminated.

B. AN ABSENCE OF PROGRESSION BECAUSE OF A BLADDER OBSTACLE LINKED TO AN UNDETECTED DISTENDED BLADDER (FIGURE N°34)

Why is a distended bladder common during labour?

In most European countries and the USA, many women receive epidural analgesia during labour. In France in 2021, more than 80% of women received epidural analgesia.

This analgesia leads not only to the **desired** disappearance of the pain associated with the uterine contractions, but it also leads to the **non-desired** disappearance of the feeling of needing to urinate linked to distension of the bladder. Under normal circumstances, that is, in the absence of epidural, it is this feeling of needing to urinate that will lead to the person urinating, thus avoiding the development of a distended bladder.

On the contrary, if an epidural analgesia is in place, the patient no longer feels the need to urinate, the bladder will start to distend until a fully distended bladder develops. Through its anatomical position, this distended bladder forms an obstacle and prevents the foetus' head from descending (Figure n°34).

Three studies have shown that women in labour with EA have a significantly higher risk of urine retention[37].

In practice, how should you proceed?

Before performing an operative vaginal delivery, you must ask: "**has the patient recently had a urinary probe?**"

If the answer is "yes, the patient has just had a urinary probe", you must ask the second question.

In this case, you must ask, "**How much urine did she evacuate?**".

If the volume of urine evacuated makes you suspect there could be a distended bladder (volume > 150 ml) and the foetus' heart rate is still normal, you must not perform an operative vaginal delivery, you just need to wait another hour. Most often, emptying the bladder will remove the obstacle and the foetus' head, which was blocked by the dilated bladder, will start to descend again and the patient will give birth spontaneously.

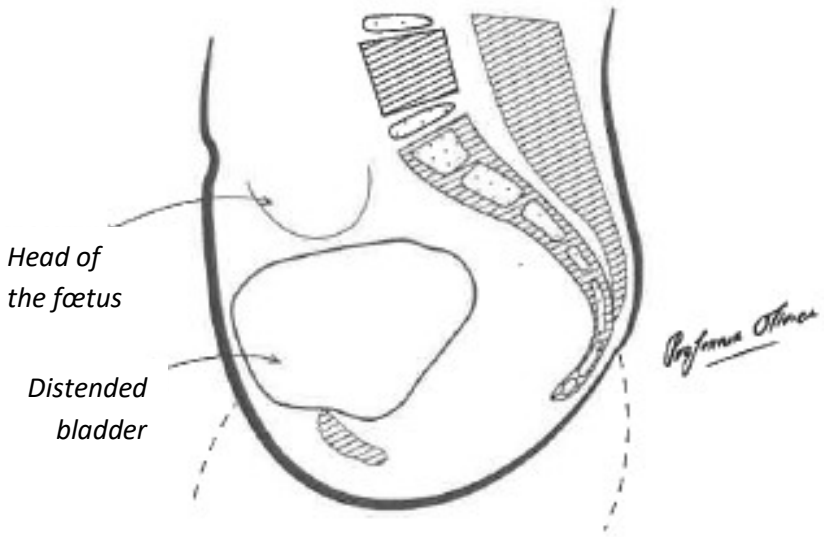
Sometimes, a simple visual examination of the patient's abdomen in profile allows you to see the supra-pubic bulge corresponding to the distended bladder.

If the answer is "no, the patient has not had a urinary probe", a urinary probe must be placed, and the volume of urine evacuated must be quantified.

If the quantity is greater than 150 ml, it is necessary to wait…

If the volume of urine evacuated is less than 150 ml, progression of the head stopping because of a distended bladder can be excluded.

FIGURE N°34



Absence of progression of the foetus' head linked to a distended bladder induced by the epidural analgesia which suppresses the desire to urinate.

Question 73

Can an operative vaginal delivery be performed at every level of the foetus' head station?

No. As we saw earlier, an operative vaginal delivery must only be performed if the cervix is fully dilated, and only if the presentation is engaged.

Effectively, until the head is engaged, it is not centred in the pelvic canal, and the risk of applying asymmetrical mechanical force is very high.

Furthermore, studies show that delivery failure rates are more than 10% in the case of high presentations. **If the head is situated at one of the following levels: "-5"; "-4"; "-3", "-2" or "-1", operative vaginal deliveries are contraindicated.**

Question 74

Is there a link between the difficulty of an operative vaginal delivery and the level of the station of the foetus' head?

Yes. The higher the head is in the pelvic canal, the greater the distance it will have to cover. Operative vaginal deliveries are all the more difficult when the head station is upper. Instrument deliveries are easier when the head station is lower.

- At levels “0” and “+1” (“mid”), the use of forceps and the ventouse is reserved for experienced obstetricians.

- At levels “+2” and “+3” (“low”), operative vaginal deliveries are much easier to perform.

- At levels “+4” and “+5” (“outlet”), operative vaginal deliveries are very easy to perform.

Question 75

You are the on-call delivering physician and you are called to the labour ward to perform an operative vaginal delivery. When you arrive, you hear the following remark: "I can see the hair, the head is coming!"

What do you think of this remark?

This remark is **potentially dangerous**. Effectively, the fact that you can “see the hair at the vulva” does not automatically mean that “the head is coming”.

If there is no caput succedaneum, the fact of seeing the hair at the vulva effectively implies that the head is coming.

On the other hand, **if there is a caput succedaneum, it is the bump covered in hair that is visible and not the skull. A caput succedaneum can be more than 3 centimetres thick[11]. If there is a large bump on the foetus’ skull, the hair will be visible even though the skull is still some way away. In other words, the head may not be engaged, when the bump is indeed engaged. In this case, there can be an absolute contraindication for an instrument delivery (see Figure n°19).**

Every time you are called for a delivery, **you must carefully examine the patient and look for a caput succedaneum via a vaginal examination. If there is any doubt about the presence of a bump, remove any doubt by performing a transperineal ultrasound (Figure n°18).**

Question 76

The clinical method (described in question 64) to assess the station of the foetus' head has two potential traps, what are they?

The first trap is linked to the difficulty in palpating the head of the foetus.

With this method, it is effectively the foetus' skull, that is, the bone of the skull and not the scalp or hair, that is taken into account as the marker, and it is thus important to estimate well the distance between the foetus' skull and the ischial spine, and not the distance between the foetus' scalp and the ischial spine.

For this reason, during a delivery, every time there is foetopelvic disproportion, that is, an incompatibility between the size of the infant's head, which is too big, and the dimensions of the mother's pelvis, which is too small, forces of friction will develop on the foetus' head. This friction will lead to the development of a bump on the foetus' head and sometimes it is this bump that descends while the head remains stuck in the pelvis.

If there is a large bump on the foetus' head, if the bump is 4 cm thick for example, during the clinical examination the doctor might wrongly believe that the head is at the level of "+4" cm, when in fact the foetus' skull is at level "+0" and only the bump is at level "+4" cm (Figure n°19).

The second trap is linked to the difficulty in palpating the ischial spine and the difficulty in estimating the distance between the foetus' skull and the spine.

It is thus necessary to be prudent, particularly if the head is estimated as being at levels "0" or "+1".

Our study on a simulator has shown that, during the vaginal examination during labour, errors of a few centimetres are common when assessing the distances[3]. A doctor might believe that the head is engaged when it is not, or believe that the head is in the "low" position when in reality it is in the "mid" position. A clinical trial conducted in 2008 confirmed the extent of these errors, with 29% of disagreement between two doctors on whether or not there was engagement in the presentation[12]. In the same study, the authors noted that the ischial spines were difficult to palpate in 10% of cases. This is why an operative vaginal delivery should never be performed in the "mid" position by a junior operator if there are signs of foetopelvic disproportion… such as a significant bump, overlap of the skull bones, or a delay in the PDT.

Question 77

(a) Describe the simplest and quickest ultrasound method that makes it possible during childbirth to assess the station of the head in the mother's pelvic canal.

(b) What is the name of the measurement that this allows you to make?

(c) Justify the name of this measurement.

(d) Draw the ultrasound image.

(Figure n°35)

(A) DESCRIPTION

This technique is called the transperineal ultrasound. Two methods have been described[14-19]. The simplest technique that we recommend[12,14-18] is as follows: empty bladder, membranes ruptured and full dilation.

We use an ultrasound probe of the abdominal type, covered in gel and then a sterile glove. The probe is placed on the vulvar fork, and is maintained in a transversal position, that is, perpendicular to the mother's plane of symmetry (Figure n°1), and thus perpendicular to the labia majora. This technique is easy, and it takes less than a minute to perform. The measurement is made during a pushing effort and without exerting any pressure on the perineum.

(B) DENOMINATION

The measurement that is made is the "distance between the foetus' skull and the mother's perineum", a measurement that I have chosen to call the "FSK to MSK distance", for "Foetal Skull to Maternal Skin" distance.

(C) JUSTIFICATION

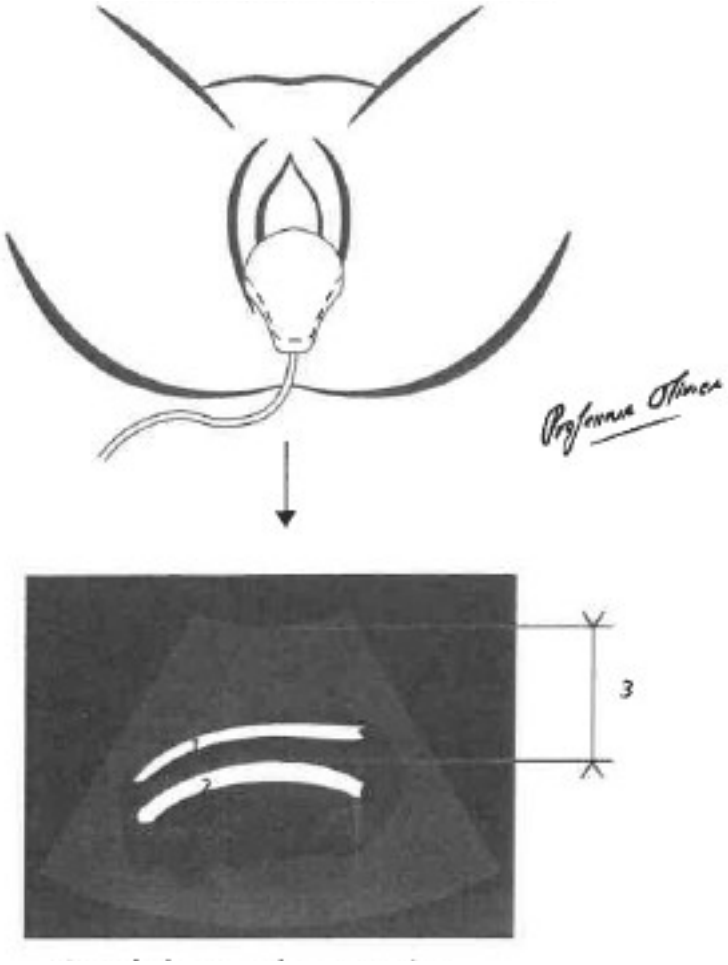
The name "FSK to MSK distance" makes it possible to remember that the measurement is made from the skull of the foetus to the skin of the mother, and not from the foetus' scalp to the skin of the mother.

(D) DRAW THE ULTRASOUND IMAGE

Figure n°35 shows the technique and the image obtained. The image is that of two white convex arcs at the top. The first white arc corresponds to the image of the scalp; the second white arc corresponds to the image of the foetus' skull. The "FSK to MSK" distance corresponds to the distance between the probe on one side, to the second white arc on the other side.

FIGURE N°35

Measuring the "FSK to MSK" (foetal skull to maternal skin) distance using a transperineal ultrasound



No caput succedaneum

1: white arc = imaging of the scalp

2: white arc = imaging of the foetus' skull

3: "FSK to MSK" distance = Foetal Skull to Maternal Skin distance using a transperineal ultrasound

Question 78

Indicate the two or three factors that can alter the reproducibility of the ultrasound measurement of the “FSK to MSK distance”.

The two factors that can alter the reproducibility of the ultrasound measurement of the “FSK to MSK distance” are:

- The intensity of the pressure exerted by the operator with the probe on the perineum. It is probable that the absence of pressure, versus maximum pressure, can lead to variations in the measurement of between a few millimetres and one centimetre. The greater the pressure, the more the measurement decreases.

- The timing of the measurement: if the measurement is made during a pushing effort and/or during a uterine contraction, the distance will be smaller. On the contrary, if the measurement is made when there is no pushing effort and no uterine contraction, the distance will increase.

Question 79

Indicate how you interpret values of the "FSK to MSK distance" of respectively 70 mm, 36mm, 20 mm, 10 mm and 40 mm.

(Figure n°36)

VALUE OF 70 MM

Many studies have been published on the results of the transperineal ultrasound[11-18]. The threshold for defining engagement and that for defining a high presentation vary from one study to another. The most often, a value of 55 mm is retained as the threshold for a high (ie unengaged) presentation[11-18].

If the value is greater than or equal to 55 mm, the presentation is high (ie unengaged) and normally an operative vaginal delivery is contraindicated.

VALUE OF 36 MM

The value at which engagement is certain is that of 36 mm or less. [42] At 36 mm, the head is engaged. If the value is between 21 and 36 mm, the presentation is low and an operative vaginal delivery is possible.

VALUE OF 20 MM AND VALUE OF 10 MM

When the measurement is between 0 and 20 mm, the presentation is outlet, and an operative vaginal delivery is easy.

VALUE OF 40 MM

When the measurement is between 37 and 55 mm, the presentation is mid, and an operative vaginal delivery is more complex. If it is performed, it must be by a senior operator. Between 37 and 55 mm is the "grey" area where the greatest caution is necessary.

This method can be used as the control every time the doctor has doubts regarding the station of the head. In addition, this method makes it possible to clearly see any bump (see question 29, Figure n°18, pages 72-74). Before using forceps or a ventouse, and during the first years of using these instruments, we recommend doing a transperineal ultrasound.

Figure n°36

Interpreting the FSK to MSK distance

Value of the FSK to MSK distance in millimetres	Anatomical equivalent Station of the head	What to do for a delivery
> 55 mm	High	Operative vaginal delivery contraindicated
37-55 mm	Grey area*	Operative vaginal delivery by a "senior" or caesarean
21-36 mm	Low presentation	Operative vaginal delivery "possible"
0-20 mm	Outlet presentation	Operative vaginal delivery "easy"

* Studies in disagreement

Question 80

What are the three advantages of the ultrasound method in relation to the clinical method for estimating the station of the foetus' head?

1. SIMULTANEOUS VISUALISATION OF A POSSIBLE CAPUT SUCCEDANEUM

With a transperineal ultrasound, the bump is clearly visible. Effectively, the foetus' head appears in the form of a hyperechogenic white arc thanks to its bony structure, and the foetus' scalp is limited by the vaginal cavity and thus also appears as a hyperechogenic white arc.

If there is a caput succedaneum, both these arcs are clearly visible and the distance between them corresponds to the thickness of the bump (Figure n°18).

As noted earlier, if there is foetopelvic disproportion, that is, an incompatibility between the size of the infant's head, which is too big, and the dimensions of the mother's pelvis, which is too small, forces of friction will develop on the foetus' head and lead to the development of a bump that can sometimes descend even while the head is stuck in the pelvis. The ultrasound eliminates the risk of failing to see the bump (see question 29).

2. THE OBJECTIVITY OF THE MEASUREMENT

On the condition that the 2 elements indicated in question 78 are satisfied (intensity of the pressure of the probe, concomitant contraction and/or pushing effort).

3. THE POSSIBILITY OF TAKING A PHOTO OF THE ULTRASOUND IMAGE.

This photo can be attached to the medical file and will have a forensic value in particular if there is a need to prove that the safety rules were followed fully by the obstetrician.

Question 81

What is the second stage during which the obstetrician can produce asymmetrical mechanical force on the foetus' head (second stage in the theory of symmetry)?

The obstetrician can produce asymmetrical mechanical force on the foetus' head when diagnosing the **position** of the foetus' head in the pelvic canal. The position of the foetus' head is defined by the relative positions of the mother's plane of symmetry and the plane of symmetry of the foetus' head.

This stage is, like the previous stage, essential because any error in estimating the position of the foetus' head can lead to a dangerous operative vaginal delivery.

Poor diagnosis of the position of the foetus' head can lead to positioning the instrument on a fragile anatomical structure, such as the eye (with forceps) or the parietal bone (with a ventouse), or even lead to exerting ineffective traction because of an inadequate axis of traction.

Question 82

What is the anatomical marker used on the foetus' head to identify the position of a cephalic presentation in vertex mode?

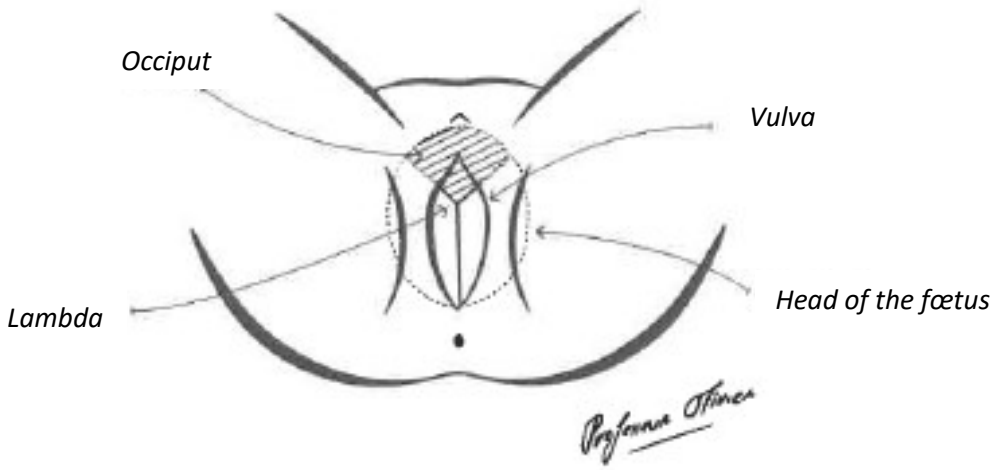
(Figure n°37)

The anatomical marker used for the foetus is the "**small fontanelle", also known as the "lambda"**.

This small fontanelle is situated **at the top of the occipital bone** of the foetus, this is why the term is found in the name of each of the 8 varieties of the top of the head, "**occiput**", that is, in part of each of the following terms: straight **occiput** anterior, left **occiput** anterior, left **occiput** transverse, left **occiput** posterior, straight **occiput** posterior, right **occiput** posterior, right **occiput** transverse, and right **occiput** anterior.

Figure n°37 shows the patient with a projection of the foetus' head in the pelvis, the occipital bone is shown in the hatched area.

FIGURE N°37



Question 83

What are the anatomical markers used on the mother's pelvic canal to identify the orientation of a cephalic presentation in vertex mode?

(Figure n°38)

The marker used for the mother is the side of the pelvis, and the part of the iliac bone anterior, posterior or transverse part which is facing the marker of the foetus.

This can be:

- either the “left” or the “right” side,

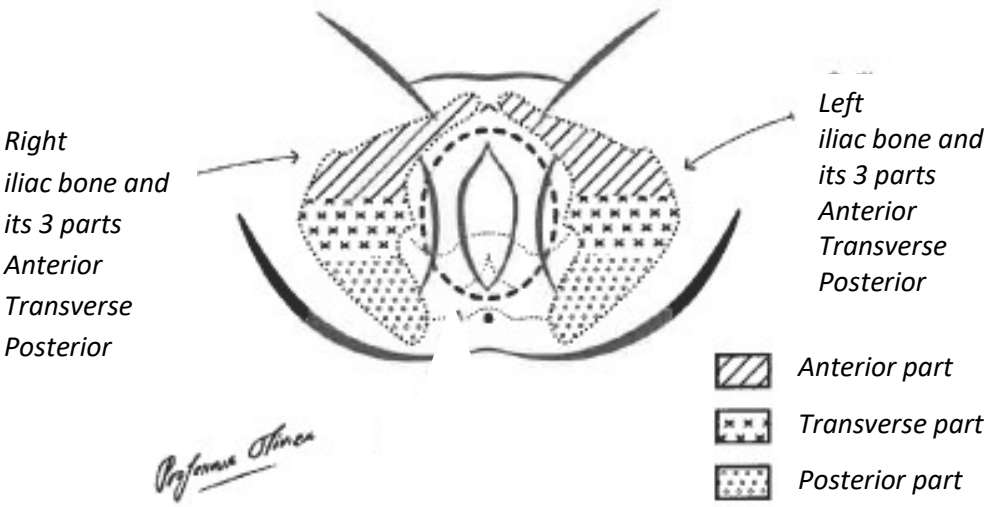
And

-either the “anterior” or the “posterior” or the “transverse”part of the iliac bone (see question 2);

These markers can be found in part of the following terms: **straight** occiput **anterior; left** occiput **anterior**; **left** occiput **transverse**, **left** occiput **posterior**, **straight** occiput **posterior**, **right** occiput **posterior**, **right** occiput **transverse**, and **right** occiput **anterior**.

In the terms above, the right corresponds to obstetric right, and the left to obstetric left. Figure n°38 shows the parturient seen from the facing lithotomy position. We show: at the centre of the dotted line, the foetus’ head at the top and the sacrum with the coccyx at the bottom, and on each side, the iliac bones with their three parts.

FIGURE N°38



Anatomical markers in the mother

Question 84

Out of convention, how many position are there for the foetus' head for a foetus in cephalic presentation in vertex mode?

(Figure n°39)

During childbirth, the foetus' head moves into the pelvic canal and turns in the pelvis. At any given moment, the foetus' head and its marker, that is, the lambda, can be more or less turned. If we represent a section of the pelvic canal like the face of a watch, the marker of the head can, like the hour needle on a watch, be situated at any time radius.

Out of convention, it has been decided to name one variety for every 45 degrees, so there are 8 varieties (360/45).

When the foetal marker, or lambda, is on the "12h": the position is referred to as "**straight occiput anterior**", or **OA,** that is occiput = small fontanelle facing the pubis, hence anterior (Figure n°39, drawing 1).

When the foetal marker, or lambda, is on "1h30" (45 degrees): the orientation is referred to as "**left occiput anterior**", or **LOA**, that is, occiput = small fontanelle facing the anterior part of the left iliac wing (Figure n°39, drawing 2).

When the foetal marker, or lambda, is on "3h" (90 degrees): the orientation is referred to as "**left occiput transverse**", or **LOT**, that is, occiput = small fontanelle facing the transverse part of the left iliac wing (Figure n°39, drawing 3).

When the foetal marker, or lambda, is on "4h30" (135 degrees): the orientation is referred to as **"left occiput posterior**", or **LOP**, that is, occiput = small fontanelle facing the posterior part of the left iliac wing (Figure n°39, drawing 4).

When the foetal marker, or lambda, is on "6h" (180 degrees): the orientation is referred to as "**straight occiput posterior"** or **OP,** that is occiput = small fontanelle facing the sacrum, hence posterior (Figure n°39, drawing 5).

When the foetal marker, or lambda, is on "7h30" (225 degrees): the orientation is referred to as **"right occiput posterior**", or **ROP**, that is, occiput = small fontanelle facing the posterior part of the right iliac wing (Figure n°39, drawing 6).

When the foetal marker, or lambda, is on "9h" (270 degrees): the orientation is referred to as "**right occiput transverse**", or **ROT**, that is, occiput = small fontanelle facing the transverse part of the right iliac wing (Figure n°39, drawing 7).

When the foetal marker, or lambda, is on "10h30" (315 degrees): the orientation is referred to as **"right occiput anterior"**, or **ROA**, that is, occiput = small fontanelle facing the anterior part of the right iliac wing (Figure n°39, drawing 8).

In practice, it is perfectly possible that, in reality, the marker, or lambda, is not strictly on one of these eight positions. In this case, out of convention, we can elect to name the position by the nearest position. For example, if the marker is situated on the radius of "1h", we are closer to "LOA" (1h30) than the "OA" (12h) orientation, so we will say it is thus an "LOA" position …

Figure n°39 shows the 8 presentations numbered 1 to 8 going clockwise.

FIGURE N°39

Occiput anterior (OA) #1

Left occiput anterior (LOA) #2

Left occiput transverse (LOT) #3

Left occiput posterior (LOP) #4

Occiput posterior (OP) #5

Right occiput posterior (ROP) #6

Right occiput transverse (ROT) #7

Right occiput anterior (ROA) #8

Question 85

These 8 types of position, also called “types of vertex” can be classified using two different classifications. What are they?

We can classify these 8 types:

1. According to their position relative to the mother's plane of symmetry and the plane of symmetry of the foetus' head.

2. According to the position of the marker on the foetus' head in relation to the mother's pelvis.

Question 86

Classify these 8 types of presentation of the vertex into three groups according to the position relative to the plane of symmetry of the mother and the plane of symmetry of the foetus' head.

If we consider the relative position of the plane of symmetry of the foetus' head in relation to the plane of symmetry of the mother, there are three groups.

1. The group of "longitudinal or sagittal types" in which the plane of symmetry of the mother's body, and the plane of symmetry of the foetus' head coincide.

These are the orientations known as "OA" and "OP"

2. The group of "oblique types" in which the plane of symmetry of the mother and of the foetus' head do not coincide and are not perpendicular, but oblique.

These are the "LOA", "ROP", "ROA" and "LOP".

3. The group of "transverse types" in which the planes of symmetry of the mother's body and the foetus' head are perpendicular to each other.

These are the orientations known as "ROT" and "LOT".

We can thus speak of "longitudinal or sagittal types", "oblique types" or "transverse types".

Question 87

Exercise 12

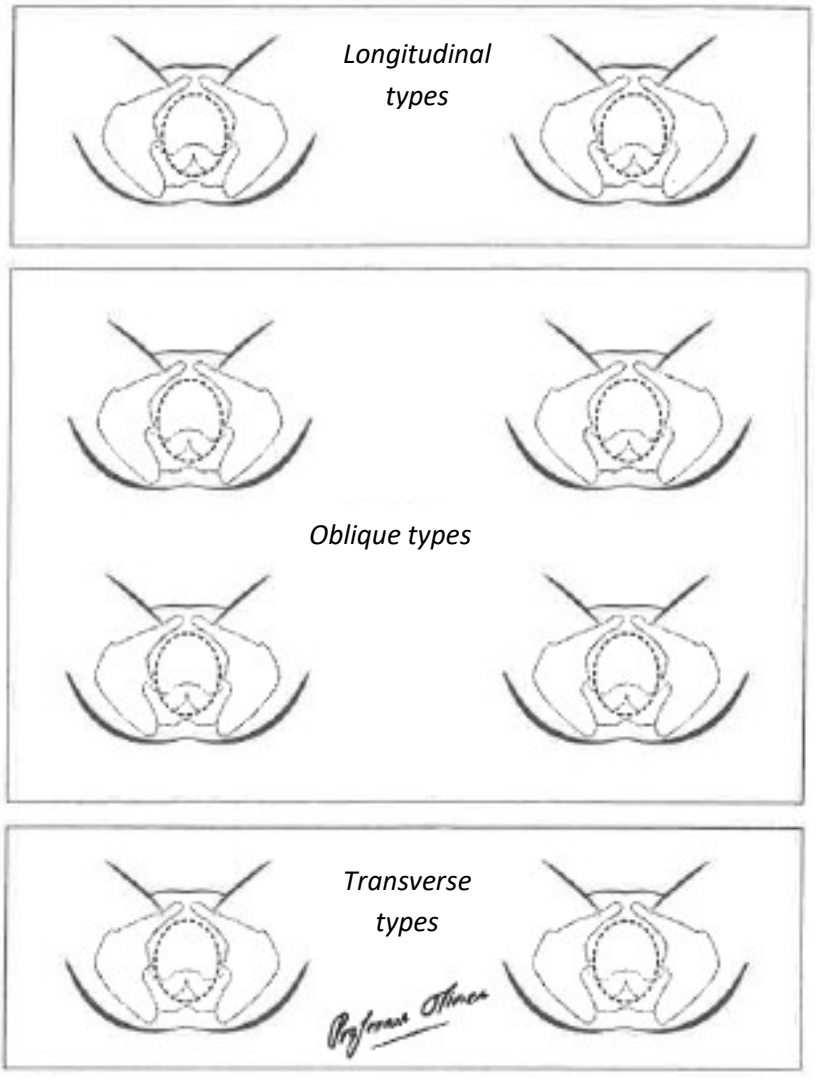
Draw and position the lambda in the 8 drawings in Figure n°40 and label each type of presentation.

(Figure n°40)

See answers on page 472 and Figure n°41 on page 473.

FIGURE N°40 Exercice n° 12

Draw in and position the lambda in each of the 8 drawings and name each type of position



(Answer: see Figure n°41, page 414)

Question 88

Classify these 8 types of presentation of the vertex into three groups according to the position of the marker on the foetus' head in relation to the mother's pelvis.

By considering the position of the head in relation to the mother's pelvis, we obtain three groups.

- **The group of "anterior types"**, in which the foetal marker – the small fontanelle, or lambda – is anterior. That is, cases in which the foetus is facing the mother's spine, as if the foetus were lying on its stomach (the patient is considered to be lying on her back). **These are the "OA", "LOA", and "ROA" types.**

- **The group of "transverse types"**, in which the foetal marker – the small fontanelle – is transverse. That is, in cases in which the foetus is lying either on its right side or its left side (the patient is considered to be lying on her back). **These are the orientations "ROT" and "LOT".**

- **The group of "posterior types"**, in which the foetal marker – the small fontanelle – is posterior. That is, when the foetus is facing the mother's navel, as if the foetus were lying on its back (the patient is considered to be lying on her back). **These are the "OP", "ROP", and "LOP" orientations.**

We can thus speak of "anterior types", "posterior types" or "transverse types".

It is important to know how to represent mentally **not only the foetus' head, but all of the foetus' body.** When we talk of a head in **OA**, you must be able to imagine a foetus lying **on its stomach, looking down.** To make it easier to learn, it is helpful to **imagine yourself as the foetus and to put yourself in the foetus' position to make sure that the concept has been completely mastered.**

Question 89

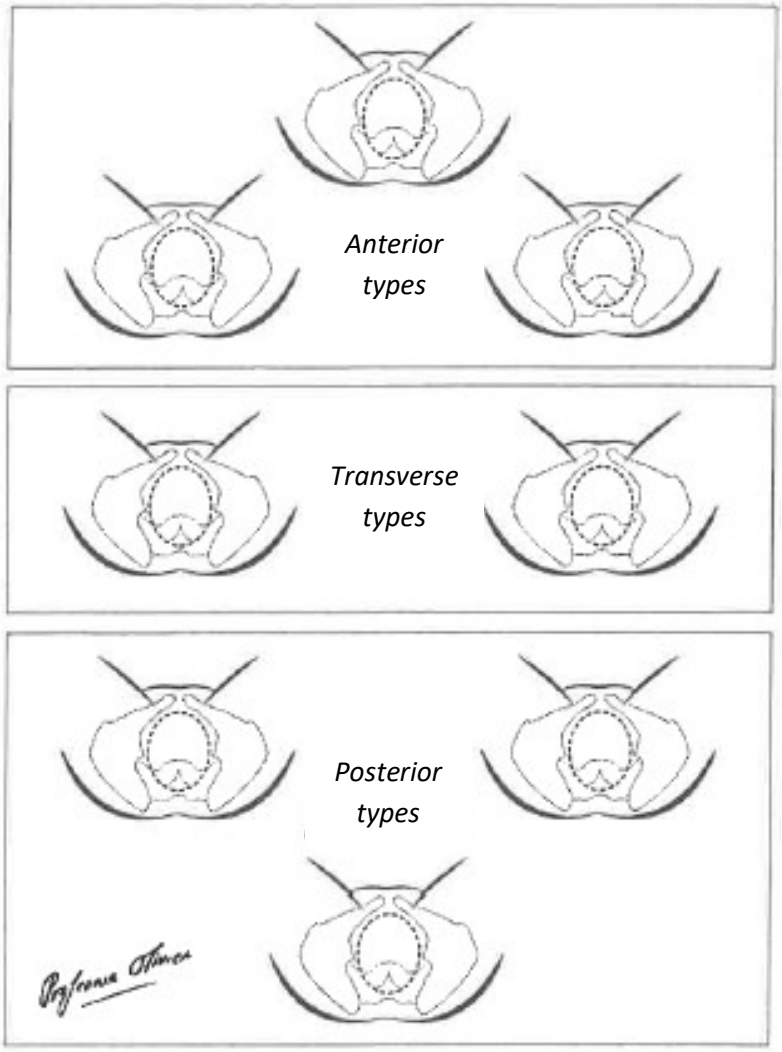
Exercise 13

Draw and position the lambda in the 8 drawings in Figure n°42 and label each type of presentation.

See answers on page 415 and Figure n°43.

FIGURE N°42 Exercice n° 13

Draw in and position the lambda in each of the 8 drawings and name the type of position



(Answer: see page 415 and Figure n°43)

Question 90

Cite the two methods that make it possible for the doctor to know the position of the head of the foetus during labour and childbirth.

There is a clinical method and an ultrasound method that allows the doctor to see the position of the foetus' head during labour and childbirth.

Question 91

How can we estimate clinically, during labour or childbirth, the position of the foetus' head?

The "traditional" clinical method consists in searching via a **vaginal examination the position of the small fontanelle and localising it in relation to the mother's pelvis.**

Once the doctor has washed their hands and put on gloves, they perform a vaginal examination with the index and middle finger, looking for the "small fontanelle" or "lambda" (see questions 6 and 7). This small fontanelle corresponds to the area on the foetus' skull composed of the occiput and the posterior part of the two parietal bones.

This fontanelle is small in size. Its surface is on average 0.51 cm^2 and it is identified when the doctor passes their finger successively over three sutures: the longitudinal suture (between the two parietal bones), then the suture between the parietal and the occiput, then the suture between the occiput and the other parietal.

Question 92

Is the traditional clinical method (described in question 91) for estimating the position of the foetus' head reliable?

Justify your answer.

This clinical method is limited and is not very reliable.

The clinical identification of the position of the foetus' head is composed of a number of significant errors. Several studies[4, 19, 20,21] have noted that **the level of error from this clinical method is situated between 18 and 39%.**

Question 93

Explain the concept of the “two fontanelles sign”.

I described the “two fontanelles sign” in 2016[5].

This method consists in performing quality control of the vaginal examination based on four anatomical criteria which apply to 100% of all foetuses:

- The large and small fontanelles are 9.5 cm apart (personal work, unpublished);

- The large and small fontanelles are situated on the same diameter of the foetus’ head, at each extremity of the sagittal suture (see Question 6);

- The large and small fontanelles have very different anatomical characteristics (see Questions 7 and 8);

- The foetus’ head is an ovoid (see Question 12).

Once the obstetrician has identified one of the fontanelles, he should be able to find the second by following the sagittal suture, 9.5 cm further. The two fontanelles sign makes it possible to perform a quality control of the vaginal examination.

For example:

- if you find what you believe to be the small fontanelle on the 12h radius, you should find the large fontanelle on the 6h radius, 9.5 cm away.

- if you find what you believe to be the small fontanelle on the 1h30 radius, you should find the large fontanelle on the 7h30 radius, 9.5 cm away.

And this rule is valid in every situation.

If the second fontanelle is found in the expected location, the two fontanelles sign is positive. The study that we carried out in 2013 showed that, in 40% of cases, it was possible to palpate both fontanelles.

In practice, we nevertheless observe that doctors, even experienced ones, can confuse the large and small fontanelle, which can lead to errors of 180 degrees. As errors of 180 degrees are possible, we recommend that a presentation ultrasound be performed all the same.

If the second fontanelle is not found in the expected location, the two fontanelles sign is negative and there is a doubt regarding the veracity of the diagnosis.

Question 94

Exercise 14

Apply the concept of the two fontanelles to the four situations represented in Figure n°44.

Follow the indications on the next page.

(Figures n°44 and n°45)

FIGURE N°44

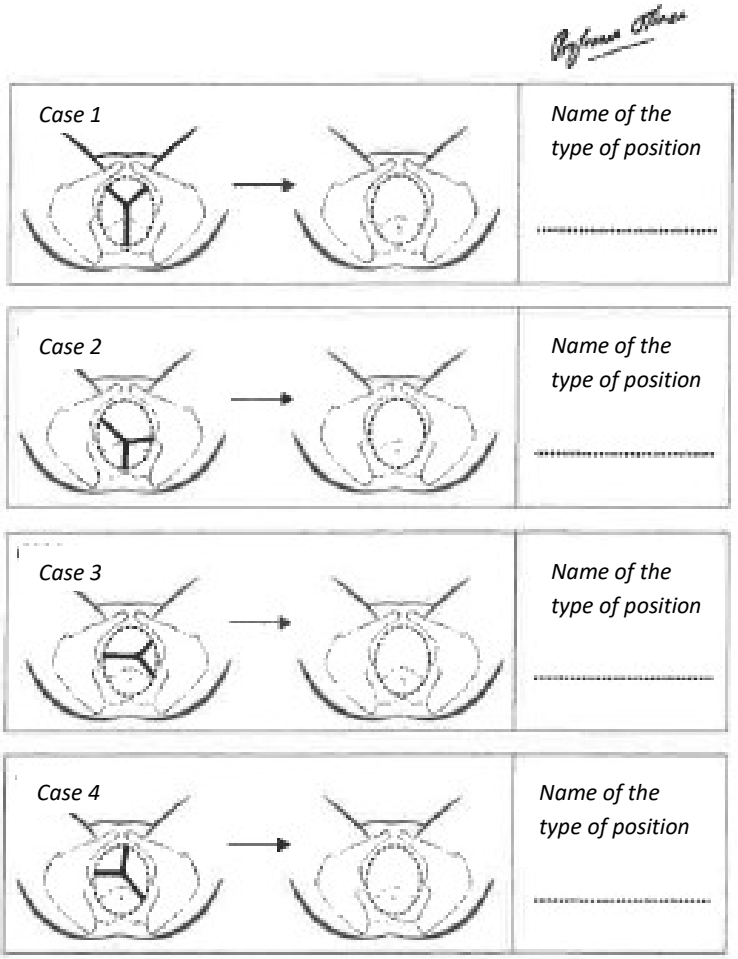
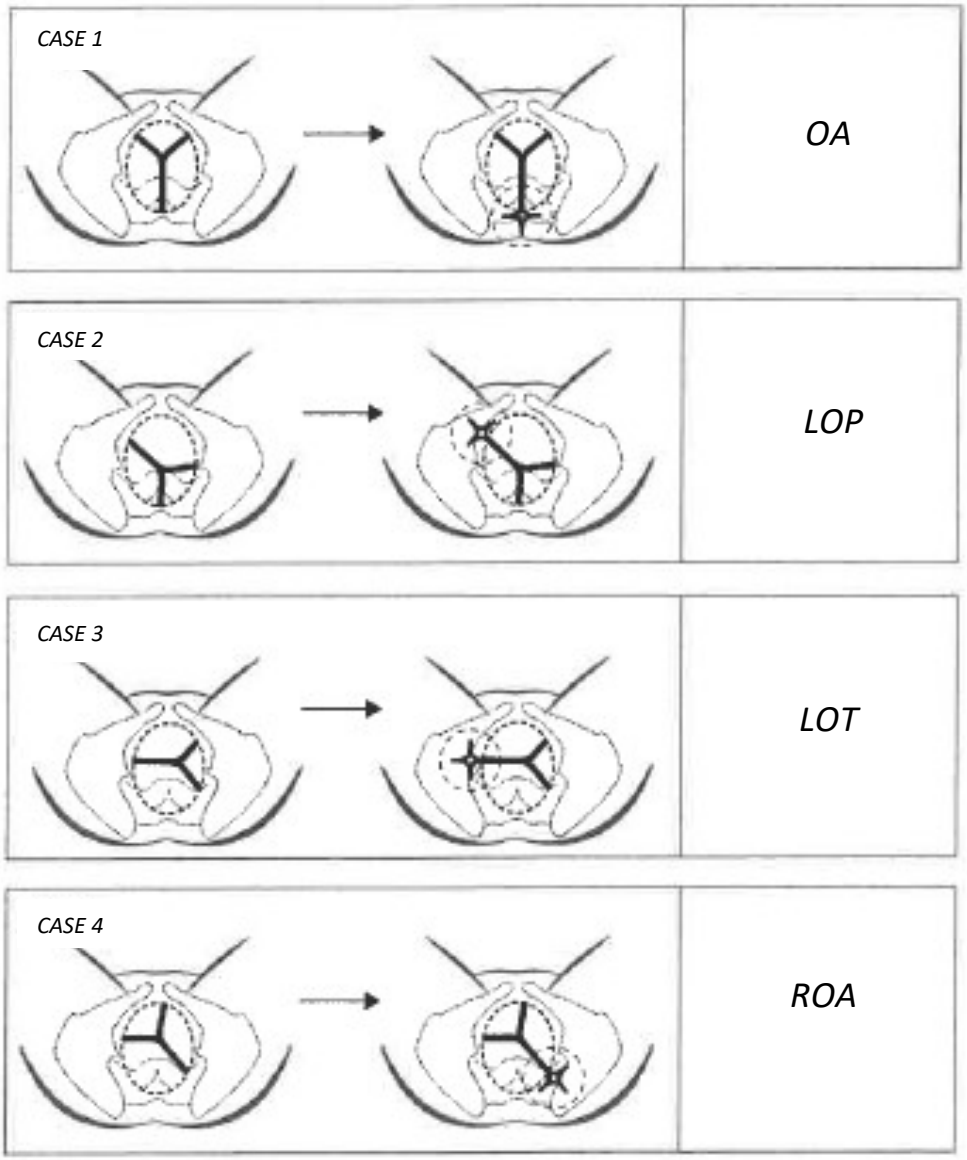


Figure n°44 shows four different deliveries, case 1 to case 4, and in the column on the left you can see the fontanelle that the obstetrician believes he has palpated. For each case, on the drawing in the column on the right:

- draw the fontanelle that the obstetrician believes he has palpated;

- draw in the area in which the palpation of the second fontanelle is expected, and draw the fontanelle.

FIGURE N°45



Professeur Ollivier

= *Area of the expected localisation of the 2nd fontanelle*

Question 95

The two fontanelles method has two limitations.

What are they?

The palpation of both fontanelles **is possible in only 40% of cases…** In more than half of all cases, the distance is too large for the second fontanelle to be palpated[5].

Even when both fontanelles can be palpated, we observe that in practice doctors, even experienced ones, **can confuse the two fontanelles, leading to errors of 180 degrees.**

Question 96

The foetal head position ultrasound

Indicate:

– What are the two characteristics that require an ultrasound which are used to perform the foetal head position ultrasound?

– Do you use an abdominal probe or a vaginal probe?

– Explain how you verify that the ultrasound probe is correctly positioned.

(Figure n°46)

There are two techniques for the foetal head position ultrasound. Here, we will describe the simplest and the one that is quickest to learn and perform[4].

Specificities of the ultrasound:

- It is important that the machine is **easy to transport**;

- It must be capable of working with a **battery so as to be operational immediately.**

Type of probe: **we use an abdominal probe.**

Verification of the orientation of the probe:

The probe is held in one hand and placed just above the pubis in the plane of symmetry of the mother (Figure n°46, top, case A).

The doctor places the index of their other hand in contact and above the probe in the plane of symmetry and verifies that, when they move their finger back and forth on the abdominal wall, it leads to movements in the image in the top left of the screen of the ultrasound. (The zone in the image that moves on the screen is represented by the circle in dotted lines on the ultrasound screen in Figure n°46). If the zone that moves is situated in the top right of the screen, this means that the ultrasound probe is the wrong way round and thus needs to be turned 180 degrees.

The probe is then placed perpendicular to the plane of symmetry of the mother (Figure n°46, bottom, case B). The doctor places their left index on the obstetric right of the probe and makes up and down movements with their finger to verify that the image that moves is clearly visible in the top left of the screen. If the image that moves appears in the top right of the screen, this means that the ultrasound probe is the wrong way round and thus needs to be turned 180 degrees.

** It should be noted that ultrasound probes have a marker that indicates which way round they are, but this direction can be modified on the keyboard of the machine, hence the importance of this verification to make sure that a previous user of the machine did not modify the direction of the image*.

.

FIGURE N°46

Method for verifying that the ultrasound probe has been correctly positioned

Case A

Case B

Indicates the up and down movement of the index finger.

Area of the image that should move if the probe is correctly positioned. If the area that moves is in the top right, that means that the probe is upside down and that you should turn it by 180°.

Ultrasound screen.

Question 97

Draw the ultrasound image of the head and neck of the foetus that is obtained when the fœtus is in the occiput anterior position and the ultrasound probe is held in the plane of symmetry of the mother, just above the pubis.

(Figure n°47)

Figure n°47 shows, from top to bottom, an ultrasound image, then the drawing of that image, and then a schematic diagram of this image.

Four markers are visible: in the form of four (hyperechogenic) white images.

On the right of the screen: a white arc simply curved, corresponding to the occipital bone (labelled 1).

On the left of the screen:

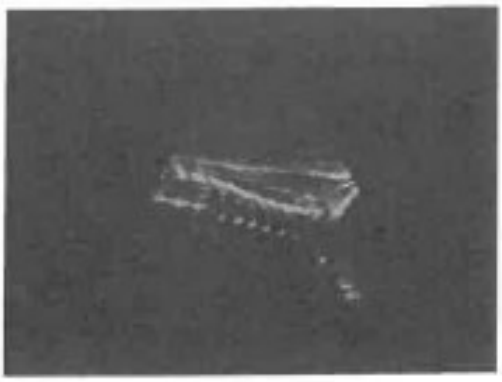
- a white arc with a double curve, which is the skin of the foetus' neck (labelled 2);

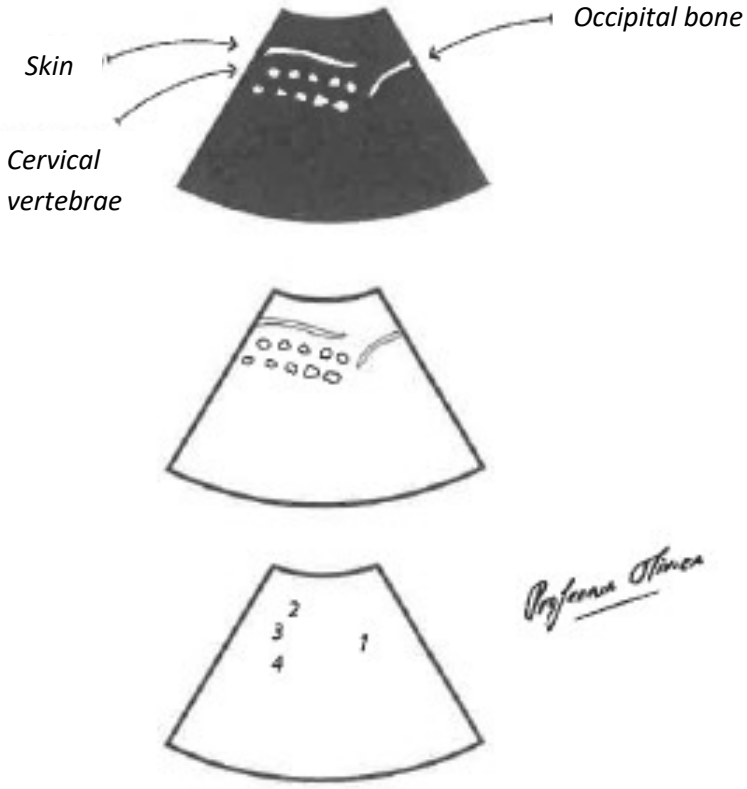
- a first row of "sugar cubes" corresponding to the succession of the posterior part of the cervical vertebrae (labelled 3);

- a second row of "sugar cubes" corresponding to the succession of the anterior part of the cervical vertebrae (labelled 4).

This image must be learned by heart so that it can be identified quickly.

FIGURE N°47





1 – White arc with a single curve
2 – White arc with a double curve
3 – First row of "sugar cubes"
4 – Second row of "sugar cubes"

Question 98

Draw the ultrasound image of the foetus' head which is obtained when the foetus is in the occiput posterior position and the ultrasound probe is held perpendicular to the plane of symmetry of the mother, just above the pubis.

(Figure n°48)

Figure n°48 shows from top to bottom an ultrasound image, then the drawing of that image, and then a schematic diagram of this image.

Five markers are visible: in the form of three anechogenic images and two hyperechogenic images.

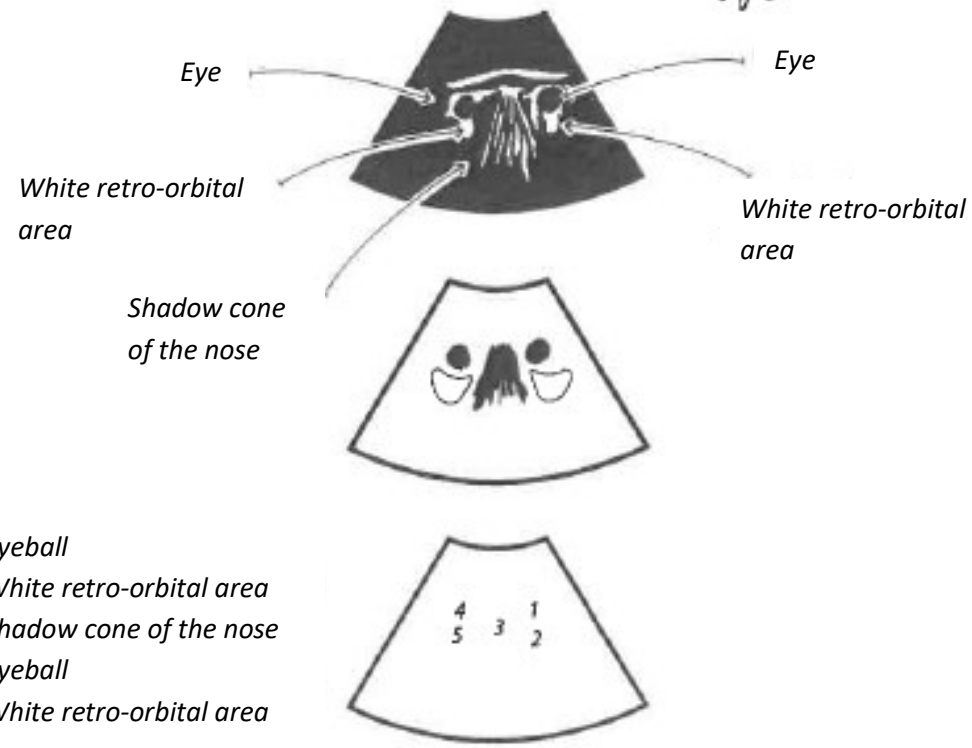
On the right of the screen: a round, anechogenic image corresponding to the eyeball (labelled 1) and underneath, an echogenic image of the posterior chamber (labelled 2), that is, a white retro-orbital area.

In the middle of the screen: an anechogenic image corresponding to the shadow cone of the nose (labelled 3).

On the left of the screen: a round, anechogenic image corresponding to the eyeball (labelled 4) and underneath, an echogenic image of the posterior chamber (labelled 5), that is, a white retro-orbital area.

This image must be learned by heart so that it can be identified quickly.

FIGURE N°48



1 – Eyeball
2 – White retro-orbital area
3 – Shadow cone of the nose
4 – Eyeball
5 – White retro-orbital area

Question 99

Draw the ultrasound image of the head of the foetus that is obtained when the foetus is in the right occiput transverse position and the ultrasound probe is held perpendicular to the plane of symmetry of the mother, just above the pubis.

(Figure n°49)

Figure n°49 shows, from top to bottom, an ultrasound image, then the drawing of that image, and then a schematic diagram of this image.

The number of markers visible varies depending on the position of the head.

But, in all cases, it is important to focus on identifying the elements that are on a median horizontal line in the middle of the ovoid of the foetus' head.

When it is an ROT presentation, you will find from right to left on the screen:

– the falx cerebri in the form of a hyperechogenic image, that is, a white line (labelled 1);

– the cavum septum pellucidum, in the form of a rectangular anechogenic image (labelled 2);

– the thalamus on either side of the median line. Each thalamus forms an anechogenic triangle, the tip of which is on the left and the base is on the right of the image (labelled 3 and 3').

The image formed by the two thalamuses (3+3') create an arrowhead that i called the "thalamic arrow". The thalamic arrow always pointed toward the occiput bone.

Thus, if the thalamic arrow points towards the obstetric right, it is an ROT presentation (Figure n°49) and, if the thalamic arrow points towards the obstetric left, it is an LOT presentation;

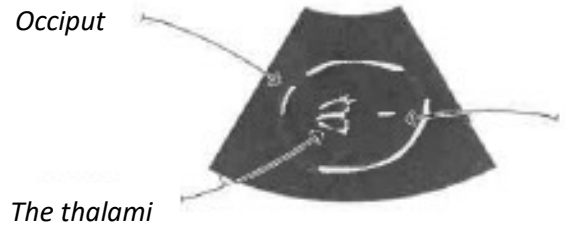
– rarely the cerebellum.

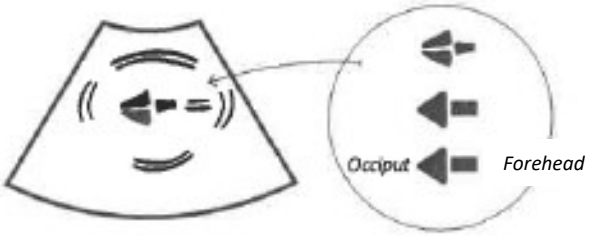
On the periphery of the image, you can find one or more parts of the cranial vault, labelled 4, 4', 4" and 4"', each one showing as a hyperechogenic curve.

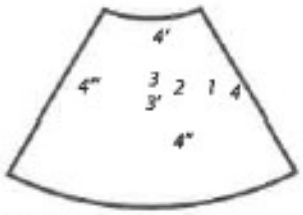
This image must be learned by heart so that it can be identified quickly.

** It should be noted that, if the head is significantly engaged, you will no longer see this image, but rather a smaller, ovoid image containing a horizontal hyperechogenic line that is more or less centred, depending on whether or not there is asynclitism and that corresponds to the falx cerebri. You will note that unlike the two images in questions 97 and 98, this image is more difficult to represent on a schematic diagram.*

FIGURE N°49







1 – Falx cerebri
2 – Cavum septum pellucidum
3 and 3' – Thalamus
4, 4', 4" and 4"' – Parts of the cranial vault

Note that **the image formed by the two thalamuses (3+3') create an arrowhead that i called the "thalamic arrow". The thalamic arrow always pointed toward the occiput bone.**

Question 100

Method for performing a foetal head position ultrasound.

Describe the seven steps in this method.

(Figures n°50, n°51 and n°52)

This method is based on the notions defined earlier:

- the eight types of position;

- the three ultrasound images studied above (Questions 97, 98 and 99).

In the context of obstetric practice, it is important to note that professionals are exposed to significant stress, which can diminish their access to their knowledge.

Every technique that makes mental anticipation possible will decrease the stress and contribute to safety.

The aim of this method is to obtain a quick and efficient diagnosis of the position of the head.

We must systematically search for, in order, the following types: OA, then LOA, then ROA, then OP, then LOP, then ROP, then ROT and finally LOT.

Figures n°50, n°51 and n°52 explain this method.

The doctor must first position the probe in the mother's plane of symmetry and look to see if he can see the image of the cervical spine and the occiput. If this is the case, the head is in the OA position (Figure n°50, top). If the doctor does not find this image, he must move the probe, keeping it parallel to the mother's plane of symmetry towards the obstetric left and, if this image is obtained, then the probe is 6 cm from the median line, and this is thus an LOA type (Figure n°50, middle). If the image obtained is 3 cm from the median line, it means that the head is between the OA and LOA positions. If the image has still not been found, the ultrasound operator should move the probe to the obstetric right, if the image is obtained, then the probe is 6 cm from the median line, and this is thus an ROA type (Figure n°50, bottom). If the image is found, then the probe is 3 cm from the median line, meaning the head is between the OA and ROA positions. This sequence is shown in Figure n°50.

If the image of the cervical spine and occiput has not been found, the ultrasound operator must reposition the probe immediately above the pubis, perpendicular to the mother's plane of symmetry and look for the image of the two eyeballs and the nose (Figure n°51). If the image is obtained when the probe is in this position, it is an OP type (Figure n°51, top). If the image is not obtained, the operator should move the probe to the obstetric left, 6 cm from the median line, maintaining the probe perpendicular to the plane of symmetry. If the image of the eyeballs and nose is obtained in this position, the presentation is of the ROP type (Figure n°51, middle). If the image is not obtained, the probe remains positioned perpendicular to the mother's plane of symmetry but this time at 6 cm from the median line on the obstetric right. If the image is obtained in this position, it is a presentation of the LOP type.

If the image is not visible, the probe should be positioned perpendicular to the plane of symmetry on the pubis, and the doctor must then look for the third image with the elements of the median line: right thalamus, left thalamus, falx cerebri. The image formed by the two thalami leads to the transverse type. If the two thalami are pointed towards the obstetric right, it is an ROT type (Figure n°52, top). If the two thalami are pointed towards the obstetric left, it is an LOT type.

FIGURE N°50

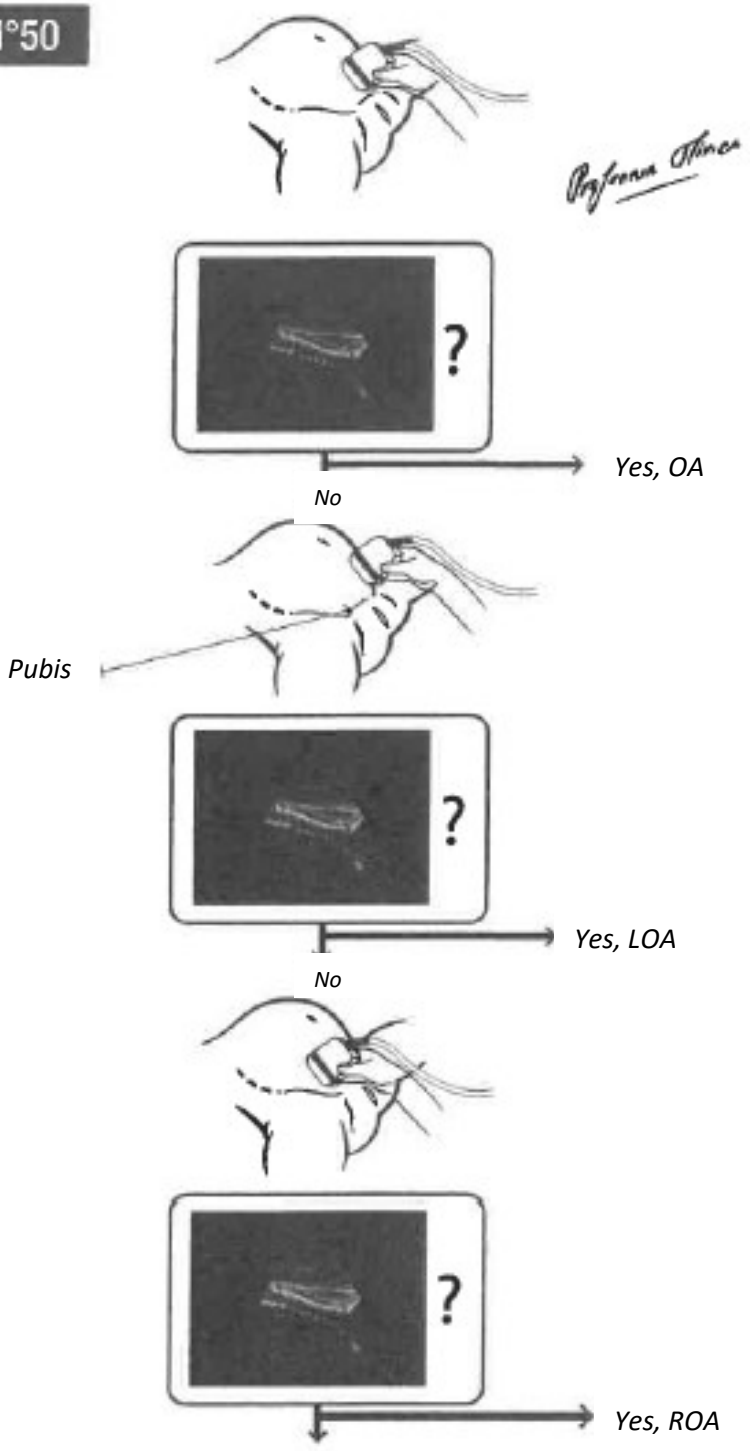


FIGURE N°51

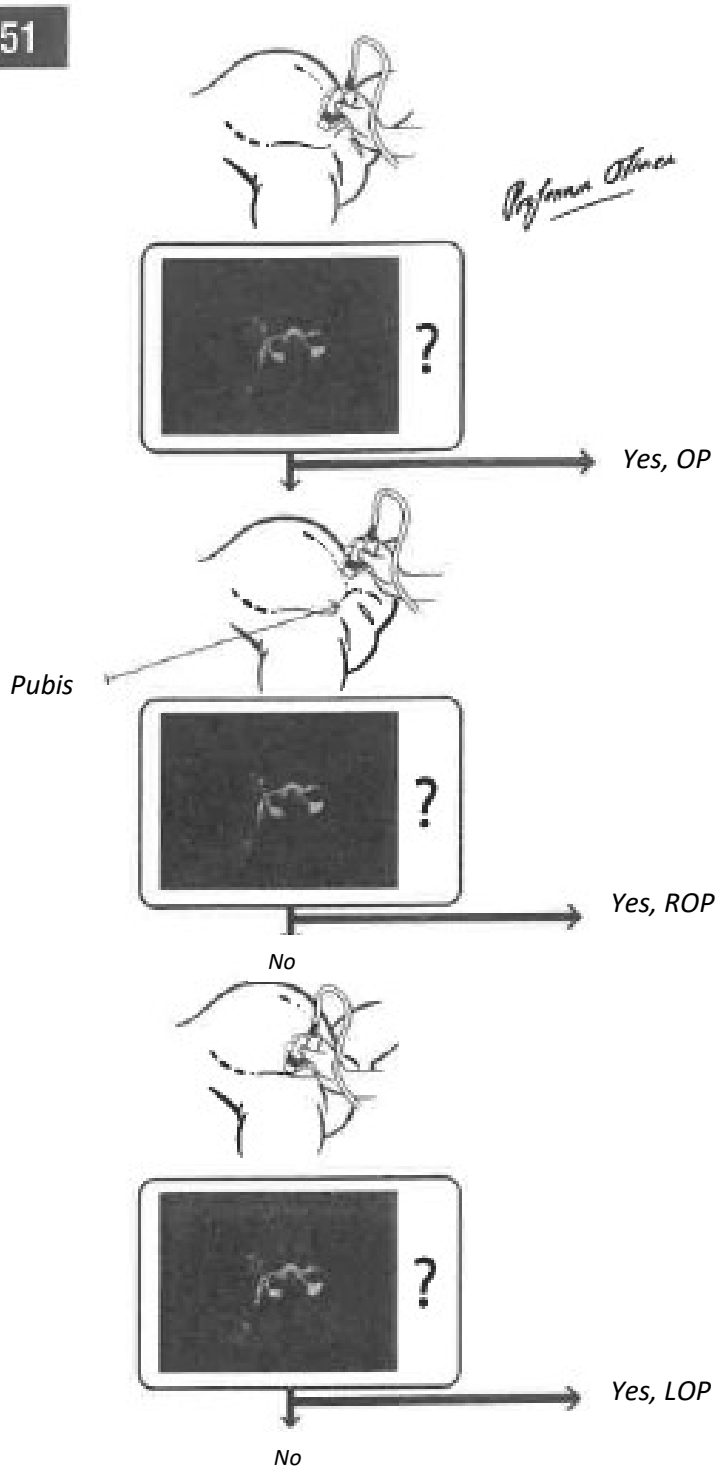
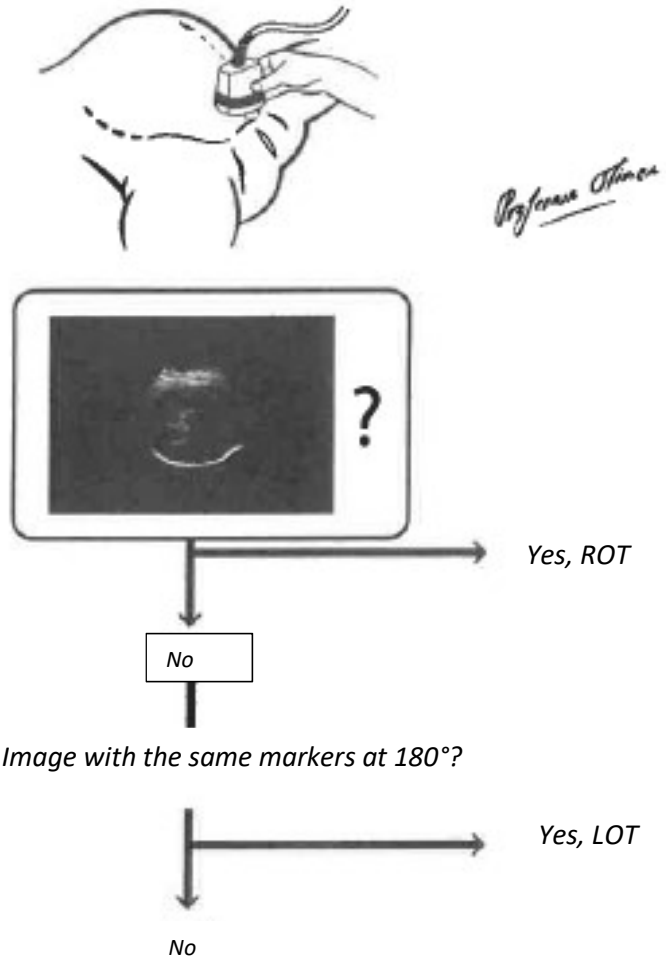


FIGURE N°52


?
Yes, ROT
No
Image with the same markers at 180°?
Yes, LOT
No
Type of position undetermined

Question 101

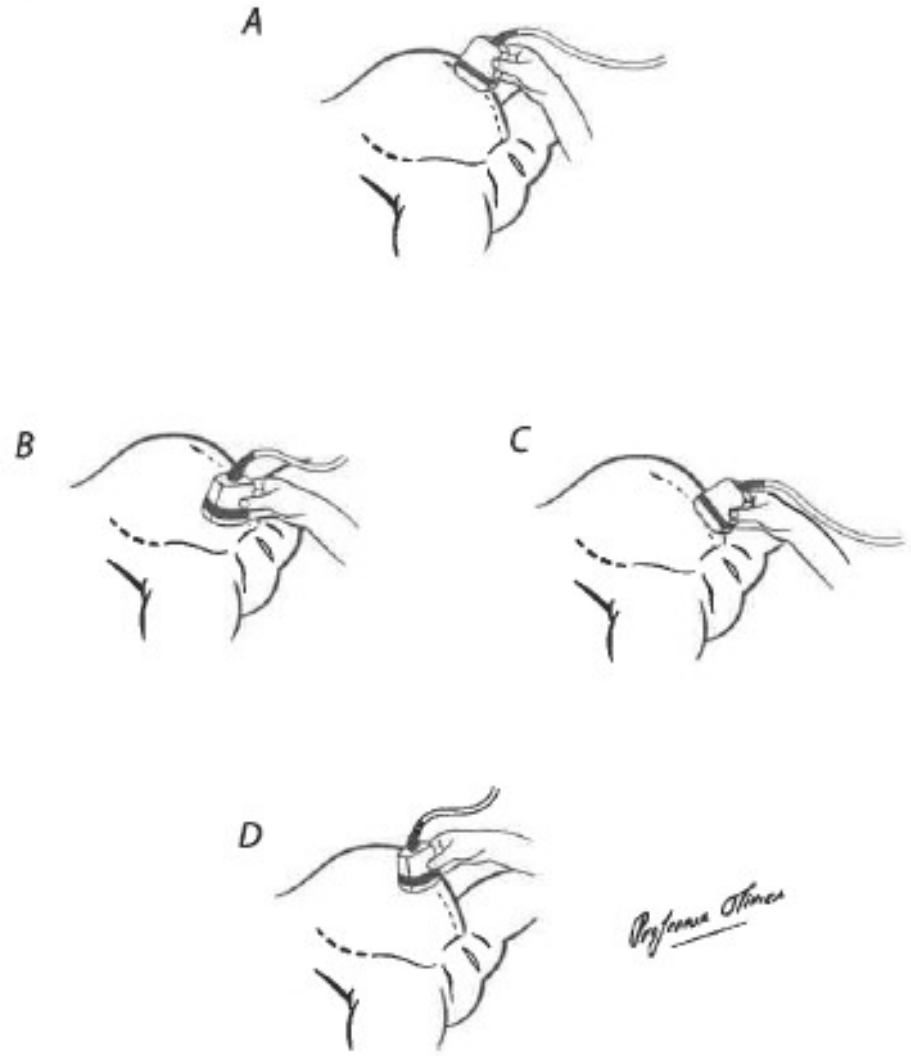
Exercise 15

Of the four drawings (A, B, C and D) in Figure n°53, indicate which shows one of the stages in the foetal head position ultrasound method.

For the other three drawings, indicate what mistake has been made.

(Figure n°53)

FIGURE N°53



Drawing A. Mistake made: the probe has been placed much too far from the pubis.

Drawing B. Mistake made: the probe is neither in the mother's plane of symmetry, nor parallel to the mother's plane of symmetry, nor perpendicular to the mother's plane of symmetry, nor parallel to the perpendicular of the plane of symmetry. The probe is in an oblique plane, which should not be the case.

Drawing C. Correct answer: the position of the probe is parallel to the plane of symmetry of the mother at approximately 6 cm from the median line. This position makes it possible to diagnose an LOA type when it corresponds to the image of the cervical spine and the occiput (see Figure n°50, middle).

Drawing D. Mistake made: the probe is much too high in relation to the pubis.

Question 102

Why is it not recommended that the doctor look for the foetal ears to verify the position of the foetus' head?

Because we have seen on the simulator that, when operators look for the ears of the foetus, they tend to exert significant pressure on the foetus' head, and this pressure can cause the head to go up the pelvic canal, when in fact our objective is to make the head come down, not go up…

Question 103

Is there a link between the position of the head and the difficulty in performing an operative vaginal delivery?

Yes, there is a link between the position of the foetus' head and the difficulty in performing an operative vaginal delivery.

During childbirth, the levator ani muscles play the part of a floodgate. In almost all cases, the foetus' head will, once it has passed the levator ani muscles, be in a longitudinal type of presentation, the most often OA, sometimes OP.

In other words, when the head is in the "outlet" position, it is almost always in a longitudinal position, whereas when the head is in a "low" position, it often has an oblique presentation and, when it is in the "mid" position, it is sometimes a transverse position.

There is thus a link between the station of the head and its position.

Furthermore, the head is freed almost always with an OA or OP position.

An extraction from a transverse position, or an oblique position implies more significant rotation of the head during the extraction, and thus greater difficulty.

Generally speaking, the most difficult to least difficult extractions are, in order, transverse positions (LOT and ROT), then oblique posterior (LOP, ROP), then oblique anterior (LOA, ROA), then longitudinal posterior (OP), then longitudinal anterior (OA).

This point is described in detail in Tome II, which focuses on forceps and ventouse deliveries.

Question 104

What is the third stage in the theory of symmetry?

The third stage in this theory is **symmetrically positioning the instrument in relation to the plane of symmetry of the foetus' head (see Question 4).**

Symmetrical positioning makes it possible to:

- **symmetrically distribute the mechanical force exerted on the foetus' skull**, and thus avoid brain or skull injuries that might be the result of asymmetrical application of the instrument;

- **perform an additional flexion** that will make it possible to reduce the diameters of the presentation and thus make it possible to resume the descent of the head thanks to flexion that will induce autorotation in the foetus' head.

The technique for positioning each instrument is described in detail in Tome II.

Question 105

What are the three elements concerning the installation of the patient that you verify before a vaginal delivery, and in particular before an operative vaginal delivery?

Three elements are important:

– a semi-seated position with the back at more than 45 degrees;

– buttocks overhanging making possible rotation of the pelvis and the mobility of the sacroiliac joints;

– thighs in the abduction position.

What you must not do:

"Place the patient on the edge of the bed" In this case, her pelvis will be resting on a hard surface which will prevent any movement in the sacroiliac joints and coccyx. The parturient must not have her buttocks "on the edge", but "hanging over" the edge of the bed.

Question 106

With regard to the uterine cervix and the membranes, what are the prerequisites before an operative vaginal delivery?

Justify your answer.

A. DILATION OF THE CERVIX

The cervix must be fully dilated.

Incomplete dilation of the cervix is an absolute contraindication for performing any operative vaginal delivery. In this case, a caesarean will be performed.

Effectively, in cases of incomplete dilation, an instrument delivery risks leading to injury to the uterine cervix, such as tearing or ripping. These injuries can lead to lethal postpartum haemorrhage.

This explains why incomplete dilation of the uterine cervix is an absolute contraindication for using the ventouse or forceps.

B. THE MEMBRANES

The membranes must be ruptured. Complete rupture of the membranes effectively plays a role in the uterine dynamic and in the application of the foetus' head.

You must thus make sure that the membranes have fully ruptured during the vaginal examination.

If the membranes are not ruptured, you must first empty the bladder, then a **quarter of an hour later rupture the membranes by exerting gentle pressure on the uterine fundus with the other hand to prevent prolapse of the umbilical cord and, if the heart rate of the foetus allows it, wait at least one more hour.**

Question 107

Is it necessary to perform a particular asepsis procedure during an operative vaginal delivery?

If yes, what?

ASEPSIS

Performing an operative vaginal delivery is a surgical act that requires that you:

- wash your hands;

- wear a mask. **Reminder: in the labour ward, all members of personnel must wear a mask.**

This is to avoid any contamination of the woman in labour by a professional with an oropharangeal streptococcus A infection;

- wear sterile gloves;

- wear a surgical cap and gown;

- perform asepsis procedures on the perineum and vagina using a solution such as povidone-iodine, **by applying the product with a compress manipulated with a surgical clamp to guarantee the chemical nature <u>but also the mechanical nature</u> of the asepsis. Simply "projecting" a spray of antiseptic is not enough…**

– keep the extraction instrument in its sterile packaging, only opening it at the last minute.

Question 108

How do you protect the perineum during an operative vaginal delivery? Cite the various acts that make this protection possible.

1. Lubricating the vagina.

A sterile soap is applied to the walls of the vagina. This plays a role not only of antiseptic, but also lubricant.

2. Positioning the hand (systematic).

Before positioning the instrument, the doctor must use the opposite hand to the one holding the instrument to protect the side wall of the vagina. In practice, we protect the wall of the vagina by spreading outwards with two fingers, with the palm of the hand always directed towards the head of the foetus. This protective hand is positioned before positioning the instrument. This act is performed regardless of which instrument is used.

3. Performing a mediolateral episiotomy (optional)

The episiotomy must not be systematic, but should be performed whenever the perineum appears to be under stress and about to tear. The episiotomy must be performed before the appearance of any skin tearing. The episiotomy is of the right* unilateral mediolateral type for right-handed doctors, or left* mediolateral for left-handed doctors (*right = obstetric right, *left = obstetric left).

The scissors are positioned on the 7h30 or 8h radius.

Attention: an episiotomy of the median type must not be performed. A very large number of studies have effectively shown that a median episiotomy frequently leads to tearing of the external anal sphincter.

4. Adapting the intensity of the traction effort at the station of the head (systematic)

Once the head has been freed and the plane of levator muscles crossed, you must decrease the traction efforts so that you are using the least force possible.

5. Rotating the posterior types on the perineum (optional)

Whenever possible, it is preferable to free the head in the OA position rather than in the OP position. Even if the head is in the OP presentation, once it has descended, it can be turned on the perineum and freed in the OA position. Attention: when this rotation is performed, it must be done gently.

6. Removing the instrument (optional)

When the head is in the +5 station or lower, you should not hesitate to remove the instrument and complete the delivery by releasing the head manually.

7. Stopping the expulsion efforts once the head has been freed (systematic)

Once the head has been freed, that is, once the head is completely outside of the genital area, the mother must immediately stop her pushing efforts.

For this, all you need to do is to tell the patient to stop pushing and/or to open her mouth. You then wait for the next contraction, so that the foetus' shoulders engage and turn in the pelvic canal. There should be **NO** pushing to free the shoulders.

<u>What you must not do</u>:

Ask the patient to push when the head has already been freed. Effectively, if the woman pushes intensely, both the foetus' shoulders risk passing through the perineum at the same time. Compare your own biparietal diameter with the width of your shoulders, that is, your biacromial diameter. What do you observe? You can see that your biacromial diameter is significantly greater than your biparietal diameter, which is why if both of the foetus' shoulders pass through the perineum in a synchronous manner, it can be very damaging for the perineum, leading to complete and major tearing of the perineum. This is considerably more damaging than the passage of the head…

Question 109

An operative vaginal delivery using a ventouse or forceps is composed of three stages. What are they?

The first stage is **the mental representation of the foetus and the instrument.**

The second stage is the **positioning.**

The third stage is **traction.**

Question 110

Give details of the first stage of performing an operative vaginal delivery and explain the value of this stage.

(Figures n°54, n°55, n°56 and n°57)

The first stage of instrument positioning is that of **mentally representing the position of the foetus in space** and **mentally representing the position of the instrument on the head**.

From the position of the small fontanelle, you must imagine the position of the head with the position of the eyes, nose and back with the cervical spine. In brief, you must represent the position of the entire body of the foetus in space, that is, know if the foetus is lying on its stomach, its back, or its side.

Figures n°54, n°55, n°56 and n°57 show four of the 8 possibilities.

In an OA position, the foetus is lying on its stomach, looking at its mother's spinal column (Figure n°54).

In an ROA position, the foetus is lying on its stomach and on its right side, looking down.

In an LOA position, the foetus is lying on its stomach and on its left side, looking down (Figure n°55).

In an ROT position, it is lying on its right side and looking horizontally.

In an LOT position, it is lying on its left side and looking horizontally.

In an OP position, the foetus is lying on its back, looking at the ceiling (Figure n°56).

In an ROP position, the foetus is lying on its back and its right side, looking up.

In an LOP position, the foetus is lying on its back and its left side, looking up (Figure n°57).

This stage is essential because it allows the doctor to visualise in space and understand several actions:

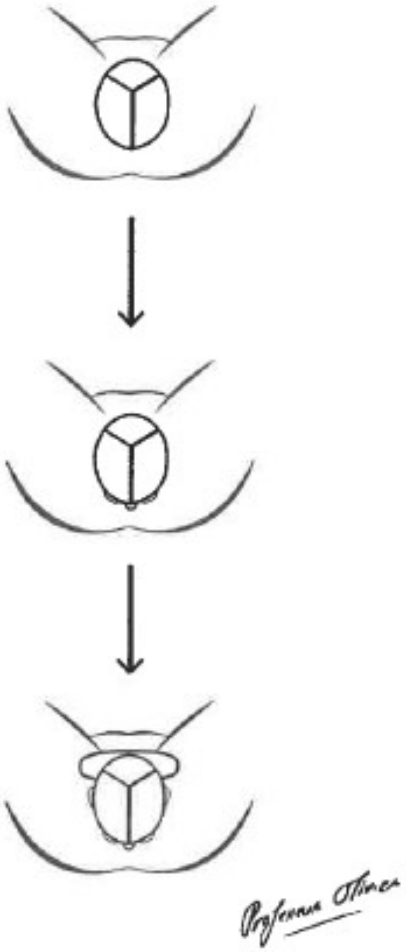
– the correct presentation of the forceps or ventouse in front of the patient, as if the instrument were in position;

– the choice of direction of rotation of the foetus: clockwise or anti-clockwise;

– the choice of the acts to be performed to resolve any possible shoulder dystocia…

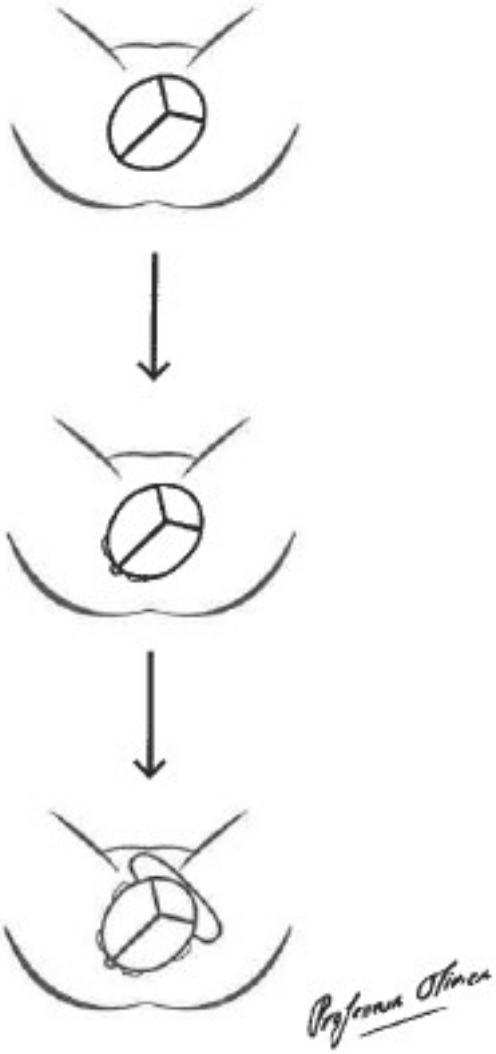
– for the forceps, identifying the branch that will be positioned first and the choice of additional flexion.

FIGURE N°54



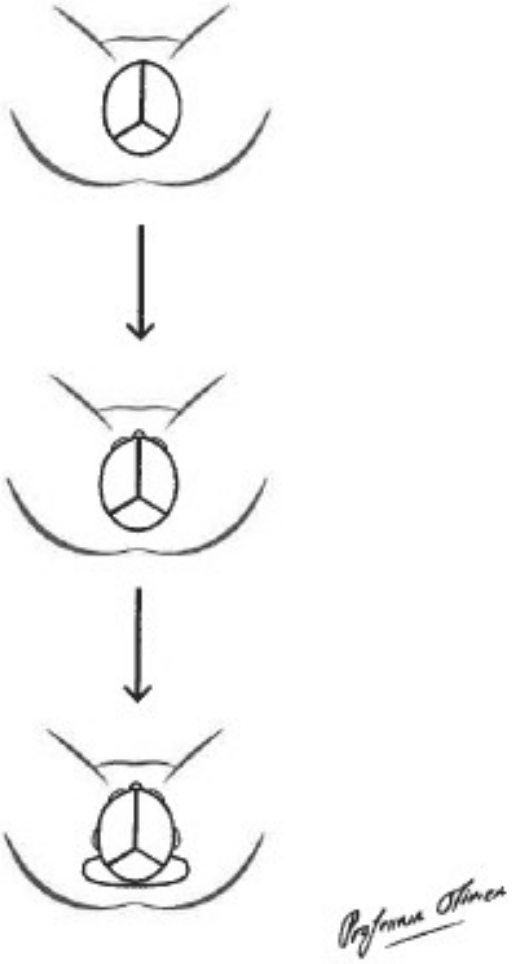
Mental representation of the
"OA" position

FIGURE N°55



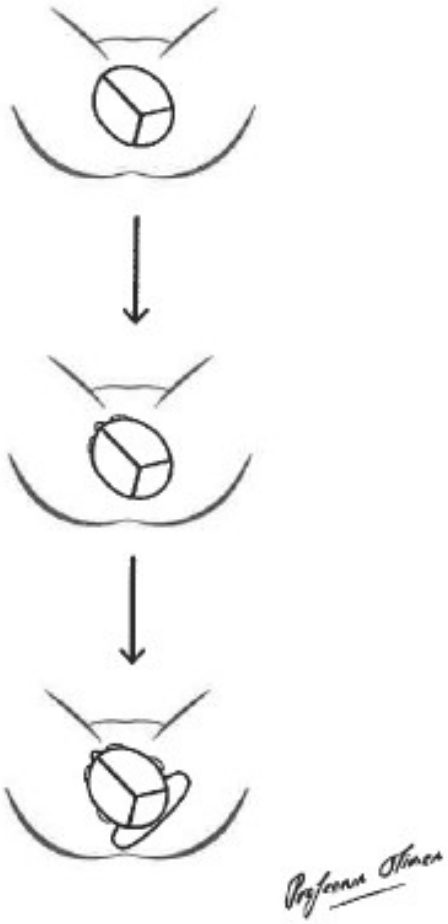
Mental representation of the "LOA" position

FIGURE N°56



Mental representation of the "OP" position

FIGURE N°57



Mental representation of the "LOP" position

Question 111

What are the three driving mechanical forces that play a part in the progression of the foetus during an operative vaginal delivery?

Concepts of AEF, VEF and IEF.

During childbirth, there is:

– a mechanical force linked to the uterine contractions that I call “automatic expulsive force”;

– a mechanical force linked to the pushing efforts by the mother, called “voluntary expulsive force”;

- a mechanical force linked to the traction of the instrument, called “instrumental expulsive force”.

These three forces are referred to as “AEF”, “VEF” and “IEF” for, respectively, automatic expulsive force, voluntary expulsive force, and instrumental expulsive force.

Question 112

From a biomechanical point of view, what is the difference between these three driving mechanical forces that work together in the progression of the foetus during an operative vaginal delivery?

Uterine contractions and pushing efforts result in the production of mechanical forces (respectively AEF and VEF), which apply symmetrically to the foetus' head and thus present little danger (see Question 47).

On the contrary, using an instrument such as a ventouse or forceps can lead to the appearance of asymmetrical mechanical forces on the foetus' head, that is, forces that are potentially dangerous. This is why the aim should always be to reduce this force as much as possible, regardless of which instrument is used.

Question 113

Cite the elements which, during childbirth, can mechanically create mechanical resistance and lead to the foetus' progression slowing down or stopping.

The elements which, during childbirth, can create mechanical resistance and lead to the foetus' progression slowing down or stopping are **friction associated with the disproportion between the surface of the foetus' head and the area of the pelvic canal**.

This can occur because of the foetus:

- the foetus' head is particularly **big**;

- the foetus' head is **deflexed** leading to it not presenting in its smallest diameter. The head can be in the anterior position and insufficiently flexed, or in the posterior position.

This can occur because of the mother:

- the bony pelvis with a narrow pelvic canal;

- levator ani muscles of the anus too tonic or contracted. The levator muscles form a pelvic diaphragm in the shape of a ship's hull and oppose the progression of the head. This muscular hull behaves like a floodgate. During delivery, the foetus' head makes contact with these muscles like a barge does with a floodgate. As it progresses, the head pushes the levator muscles apart, like a barge pushing through the gates of a lock. If the driving forces are greater than the resistance, the head will pass through these levator muscles and the resistance to this progression will suddenly diminish. This sudden decrease in resistance must be anticipated to adapt, that is decrease, the traction force…

- thick, soft parts (excess weight, obesity);

- bladder obstacle: distended bladder;

- uterine obstacle: isthmic fibroma or cervical fibroma.

Question 114

Is the resistance cited in the previous question of fixed intensity, or is it modifiable during childbirth?

On the foetal side:

- The resistance linked to insufficient flexion of the head can potentially be modified. The flexion of the head can be obtained either by performing with the instrument, during traction, an "**additional flexion**", or by producing an **anterior rotation** of a posterior type position. The flexion provoked will thus reduce the diameters facing the pelvic canal, and that in turn will lead to the progression of the head starting up again.

On the mother's side

- The levator muscles are striated muscles that are activated voluntarily. **Peridural analgesia** can relax these muscles, just as **a state of confidence in the mother** can lead to a drop in tonicity in these muscles. A **large episiotomy** can partially section these muscles.

- The resistance associated with a particularly thick hypodermis can be diminished by a **mediolateral episiotomy**.

- The resistance associated with a distended bladder disappear after **emptying via urinary probe.**

Question 115

During childbirth, is the resistance that the foetus must overcome of constant intensity or variable over time? If it is variable, justify your answer.

(Figure n°58)

The forces of resistance that the foetus must overcome to progress towards the vulva vary over time.

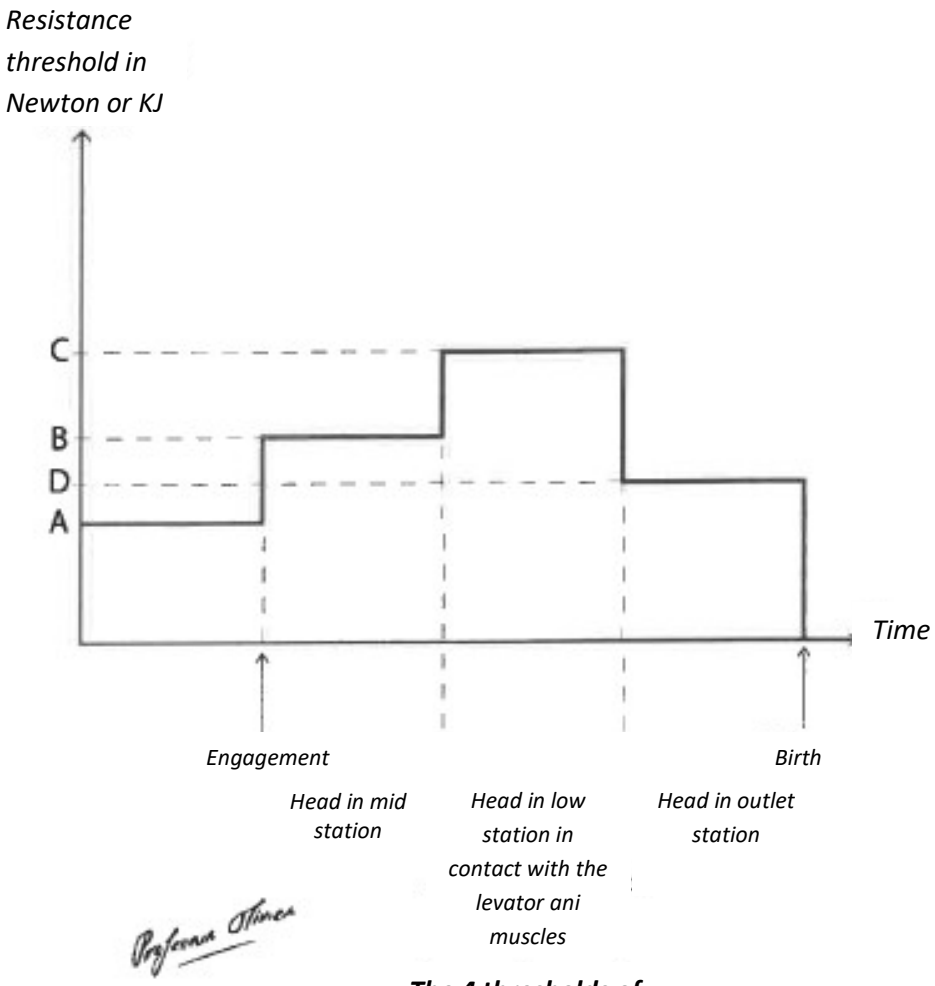
While the foetus' head is **in the greater pelvis**, the resistance is low. Effectively, the pelvis is wide, and the foetus is far away from the levator muscles (except in the case of a distended bladder or praevia fibromas). The threshold of resistance is low (value A, Figure n°58).

When the foetus' head **enters the lesser pelvis, that is, the pelvic canal** when it becomes engaged, the threshold of resistance increases (value B, Figure n°58), reaching its maximum when the head is in the middle strait, that is, **confronted by the barrier of levator muscles and ischial spines (value C).**

Once the head has passed the levator muscles and ischial spines, the head is in the outlet station, and the threshold of resistance decreases (value D), becoming null at the moment of birth.

Figure n°58 maps these four phases of childbirth, and the four values (A, B, C and D) are the thresholds of resistance.

FIGURE N°58



The 4 thresholds of resistance

Question 116

What is the biomechanical reason that explains why the foetus' head progresses or stops progressing during childbirth?

Every time the sum of the driving forces exceeds the threshold of resistance, the head moves forwards, and when the driving forces are lower than the threshold of resistance, the head stops progressing.

Question 117

List the actions that you must perform to help the head progress during a vaginal delivery.

Decrease the resistance:

- flexion of the head during the instrument delivery;

- rotation of the head into an anterior position can be done manually or with forceps in cases of transverse or posterior positions;

- episiotomy in case of tension in the perineum;

- relax the levator muscles by means of **locoregional analgesia;**

- urinary probe in case of a distended bladder.

Increase the driving forces:

- increase the pushing efforts of the mother (**semi-seated position**);

- exert traction with a **ventouse or forceps**;

- **synchronise** the three forces (AEF, VEF and IEF).

Question 118

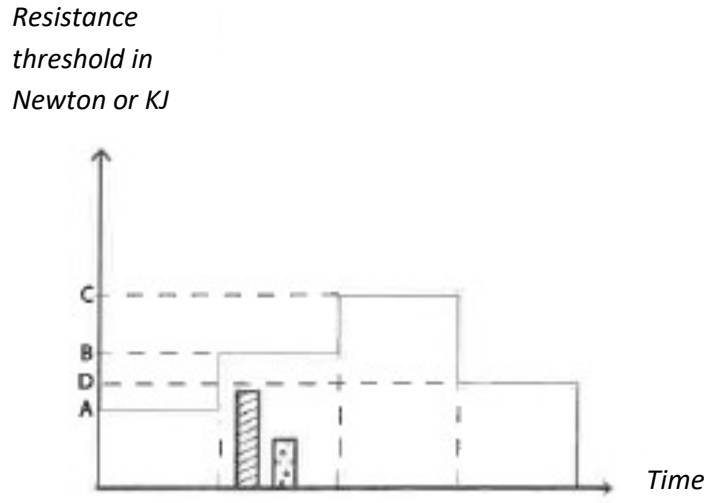
Exercise 16

Figure n°59 shows the forces present during a spontaneous vaginal delivery.

Explain the situation presented in the diagram at the top of Figure n°59, then fill in the diagram at the bottom of Figure n°59 by drawing in the AEF and VEF columns corresponding to optimal synchronisation.

(Figures n°59 and n°60).

FIGURE N°59 **Exercice n°16**



Complete the figure above by drawing in the columns for AEF and VEF corresponding to a situation of optimal synchronisation.

Synchronisation consists in applying the driving forces simultaneously.

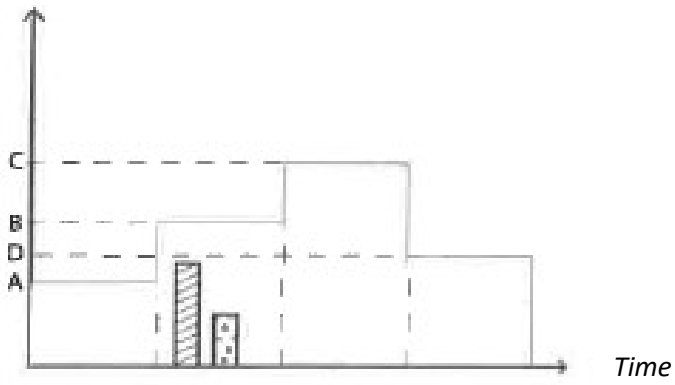
The diagram at the top shows **an absence of synchronisation**: the patient makes an expulsive effort when the uterine contraction ends. The driving forces do not accumulate, and the threshold of resistance for value B is not exceeded. We thus see the progression stop (Figure n°59, top).

In the diagram at the bottom, draw two superimposed columns: the driving forces thus accumulate, the threshold of resistance of value B is exceeded and the foetus progresses (Figure n°59, bottom).

Figure n°60 shows the answer.

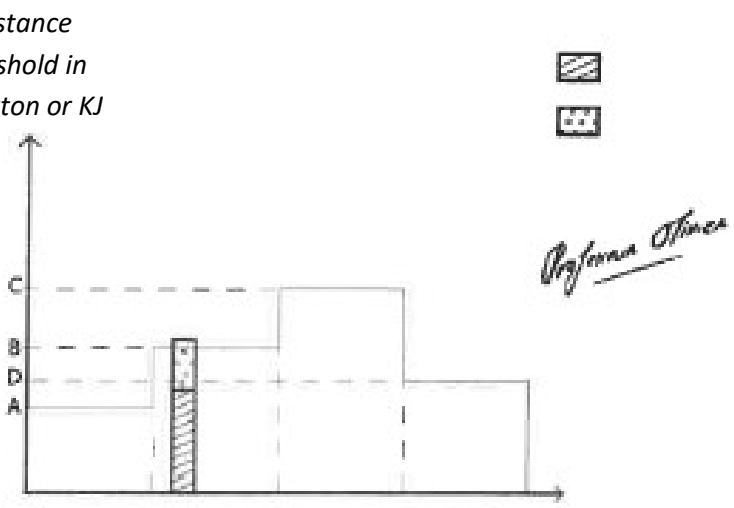
FIGURE N°60

A



Poor synchronisation – progression stops

B



Good synchronisation – progression continues

Answer to exercice n°16

Question 119

Exercise 17

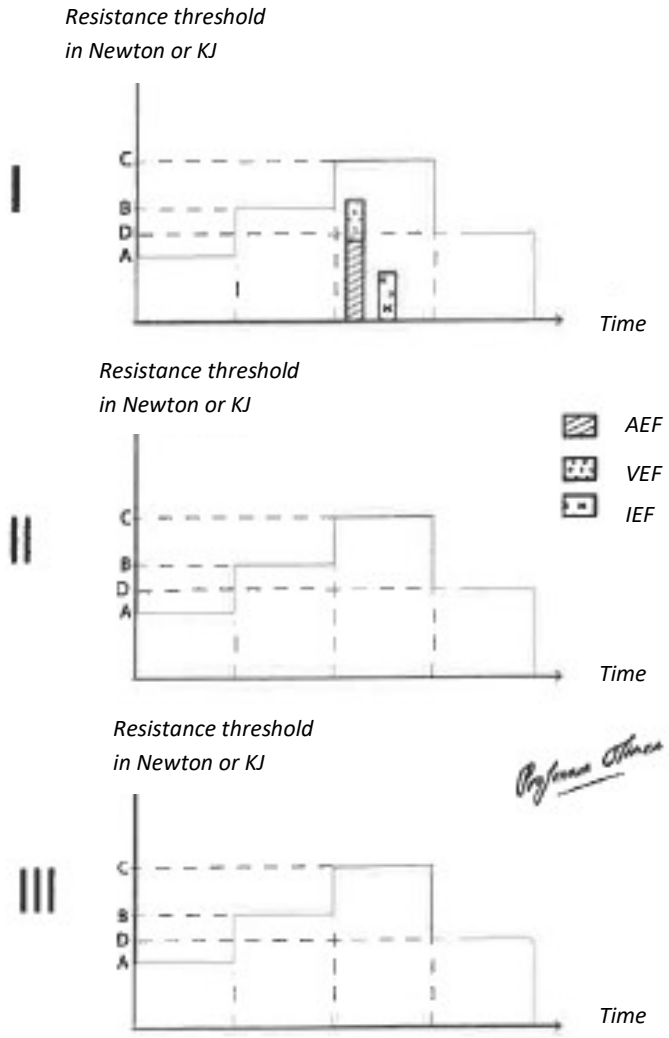
Figure n°61 (top) shows the forces present during a vaginal delivery with an instrument, either forceps or ventouse. Explain the situation presented in the diagram at the top, then, in the middle diagram of Figure n°61, draw in the columns AEF, VEF and IEF corresponding to a situation of optimal synchronisation.

On the diagram at the bottom of Figure n°61, show the height of the IEF column which would make possible the progression of the foetus in the absence of synchronisation.

(Figures n°61 and n°62)

FIGURE N°61 **Exercice n°17**

Operative vaginal delivery



Complete Figure II by drawing in the columns for AEF, VEF and IEF with optimal synchronisation.

Complete Figure III by drawing in the IEF column that would make progression of the foetus possible in the absence of contractions and in the absence of expulsive efforts.
(Answer: see Figure n°62)

During a ventouse or forceps delivery (Figure n°61), you must synchronise the expulsive efforts with the uterine contractions and traction efforts.

Figure n°61 (top) shows poor synchronisation. The doctor exerts traction when there is no contraction and, when there is no expulsive effort, the threshold of resistance of value C is not reached, so the head does not progress.

In Figure n°61 (middle), draw the three columns superimposed. The driving forces accumulate, value C in the threshold of resistance is exceeded, and the foetus progresses.

In Figure n°61 (bottom), show poor synchronisation: the height of the column needed to allow the foetus to progress is much larger.

Synchronisation consists during childbirth in synchronising the three driving forces which are the automatic, voluntary and instrument expulsive forces (AEF, VEF and IEF) (see question n°111). This applies to all operative vaginal deliveries.

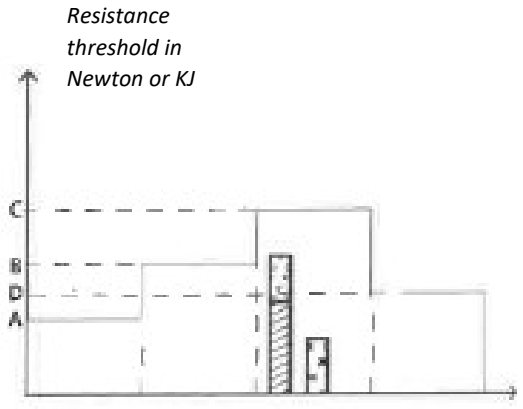
The doctor must thus ask the patient to push at the start of the uterine contraction and it is at that moment that the doctor must exert the traction with the forceps or ventouse. As soon as the patient stops pushing, or the contraction has ended, the doctor must stop the traction.

The aim of synchronisation is to use the lowest instrumental expulsive force possible.

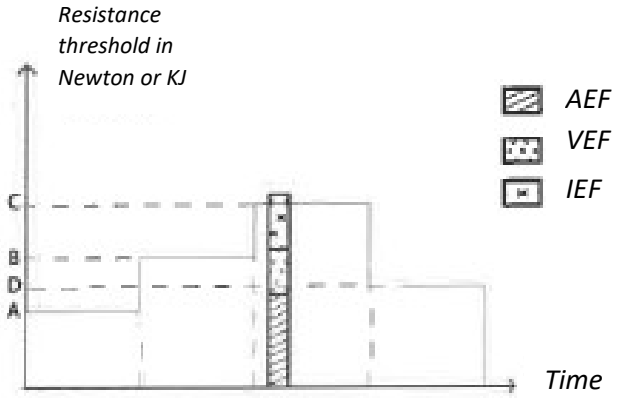
FIGURE N°62

Operative vaginal delivery

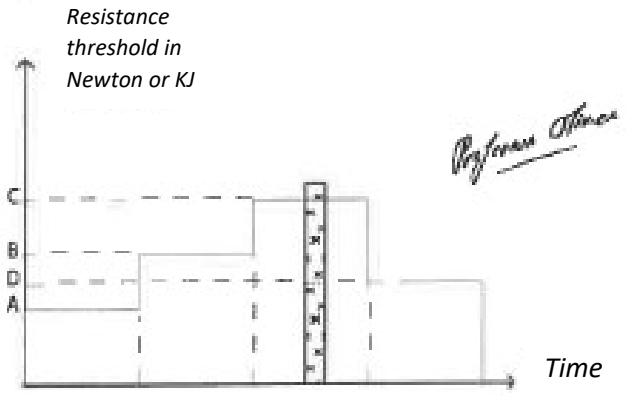
I



II



III



Question 120

What is THE essential condition for ensuring good synchronisation during an operative vaginal delivery?

The cooperation of the patient is the key element for obtaining good synchronisation.

The need for an operative vaginal delivery causes significant stress for the mother.

It is necessary to:

– Decrease the stress and anxiety of the patient:

Explain, with simple words, why the instrument delivery is desirable: the heart is weakening or the progression has stopped.

Tell the mother what position her child is in: looking up, down or to the side.

Explain that in case of failure to progress, she must not be afraid, there will be no insistence, and a caesarean section will be performed.

Explain that the **instrument is an aid, but that the pushing efforts are very important.**

Allow the partner to be present: discussions with a large number of patients after an operative vaginal delivery have shown us that the presence of the partner is often considered reassuring by the mother. **If the presence of the partner does not result in extra stress for the doctor, and if the partner agrees to support his companion, it is recommended that he be allowed to stay in the labour ward at the level of his companion's head.**

- Obtain good quality analgesia.

Question 121

What type of analgesia should be used during an operative vaginal delivery?

Before any operative vaginal delivery, the degree of pain must be evaluated. If pain is present, the following actions are possible:

A) The delivery is not urgent:

If a peridural has been put in place: reinject a dose, and if that is not enough, redo an EA.

If no peridural has been put in place: ask the anaesthetist to put in place loco regional analgesia.

B) If the delivery is urgent:

If a peridural has been put in place: reinject a dose.

If no peridural has been put in place: make a local injection of 10 ml of non-adrenaline lidocaine at the level of each ischial spine.

The delivery must not be performed in a patient in pain or agitated.

In rare cases, and particularly if the foetus' condition is preoccupying, such as in case of bradycardia without recovery occurring in the absence of peridural analgesia, a local anaesthetic can be used, and in cases where this fails, a general anaesthetic can be used.

In a patient under general anaesthetic, synchronisation is impossible, and in this case, only forceps should be used.

Question 122

Cite the three main indications for operative vaginal deliveries.

The three main indications for operative vaginal deliveries are:

- **The foetus has stopped progressing.**

- **Significant anomalies in the foetus' heart rate**, making it desirable for the foetus to be born.

- **The association** of stopped progression and significant anomalies in the foetus' heart rate.

Question 123

What causes progression to stop?

The progression of the foetus can stop because of:

Either driving forces that are too low:

- Uterine contractions of insufficient force (low AEF)

- Expulsive efforts that are too low (poor technique, fatigue, or pain in the mother) (low VEF)

- Poor synchronisation between the expulsive efforts and the uterine contractions

- An association of these mechanisms

Or resistance that is too strong:

- Foetopelvic disproportion with a foetus that is too big for a pelvis that is too small

- Poor flexion of the foetus' head

- Hypertonic perineum

- Distended bladder.

- Praevia obstacle: fibroma…

More often than not, several mechanisms work together to stop the progression of the foetus…

Question 124

Is there a link between traction, flexion, and rotation?

If yes, what is it?

(Figure n°63)

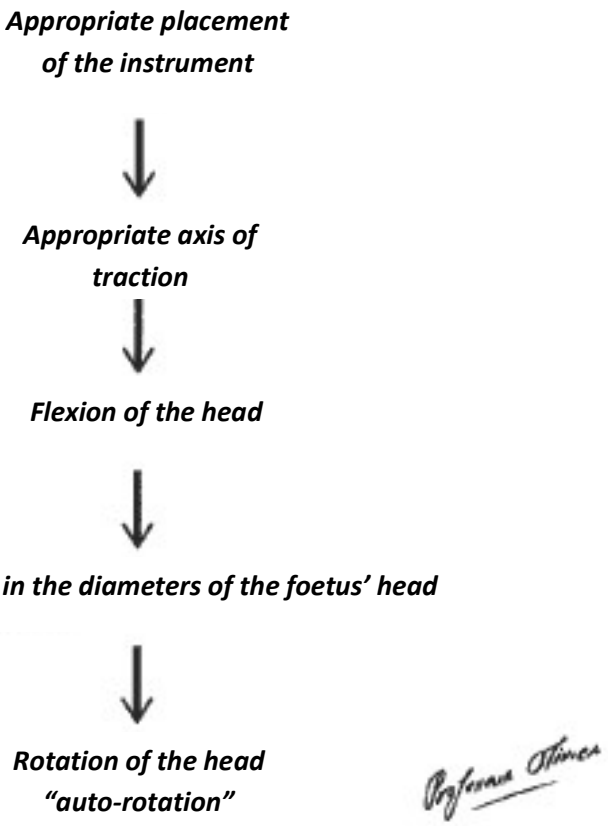
Yes, there is a link between traction, flexion, and rotation. This link is essential.

If the instrument is well positioned AND the traction axis is correct*:*

the traction leads to flexion, and this flexion improves the confrontation between the pelvis and the foetus' head**.**

The foetal ovoid has a large axis that comes close to the axis of the pelvic canal, the centre of the figure follows the curve of Carus, and the rotation takes place spontaneously – this is an ***auto rotation*** (Figure n°63).

FIGURE N°63


Appropriate placement of the instrument
Appropriate axis of traction
Flexion of the head
Decrease in the diameters of the foetus' head
Rotation of the head "auto-rotation"

Question 125

(Traction)

During an operative vaginal delivery, started in the upper part of the pelvic canal, should the traction be exerted in the same axis or in several axes?

Indicate which is the single most important parameter which, during an instrument delivery, allows you to select the traction direction.

(Figure n°64)

During a delivery, the progression of the foetus should reproduce the physiological progression of the foetus. The foetus' head will follow the curve of Carus (Question n°53). As this curve is pronounced, **the axis of traction will change as the head descends.** During an operative vaginal delivery started in the upper part of the pelvis, the axis of traction changes considerably.

The main parameter making it possible to choose the direction of traction is the station of the foetus' head.

Make sure that the position does not impact the verticality or horizontality of the axis of traction. Thus, the higher the station of the head, the more the direction of traction is vertical.

Upper station traction is directed vertically downwards (Figure n°64, top drawing)

Middle station traction is directed obliquely downwards (Figure n°64, middle drawing)

Lower station traction is directed horizontally (Figure n°64, bottom drawing).

Once the head has been freed, the instrument is removed, and the axis of delivery is aimed upwards.

The only exception to this rule is in cases where there is asynclitism. In this case, the axis of traction can be slightly oblique initially.

FIGURE N°64

Axis of traction during an operative vaginal delivery.

The higher the station of the head,

the more vertical the axis of traction.

Question 126

During an operative vaginal delivery, is there a simple means for helping the operator adopt an appropriate axis of traction?

The simplest means is to recommend that the operator adopt a body position that corresponds to the axis of traction.

As stated in question 125, the higher the station of the head, the more the axis of traction is directed vertically and downwards, that is, towards the ground.

In other words, the higher the station of the foetus' head, the closer the doctor should be to the ground.

In the upper part of the cavity, the operator should kneel on the ground or sit on a footstool at 10 or 15 cm from the ground and direct the traction downwards.

In the middle part of the cavity, the operator can also sit on a footstool and adopt an axis of traction oblique and downwards.

In the lower part of the cavity, the operator can remain seated or stand up gently and at the same time orient the axis of traction horizontally.

Question 127

Traction and the so-called “extra flexion act”.

Define this “extra flexion”.

The extra flexion is an additional flexion at the time of traction with the instrument.

In anterior positions (OA, LOA, ROA), the extra flexion occurs simply by doing the traction in the correct axis, that is, in the coccygeal-umbilical axis.

In posterior positions (OP, ROP, LOP), the extra flexion, in cases where forceps are used, is an additional movement called a “rolling movement” that will be explained in detail in Tome II.

In all cases, this “extra flexion” will lead to a decrease in the diameter of the head that will be confronted with the pelvis, and will thus lead to an “auto rotation” of the head that will help the head progress.

Question 128

(Traction)

We have seen that well performed traction leads to auto rotation. Is there a second type of rotation possible during an operative vaginal delivery?

There are two types of rotation:

– "Passive" rotation, also called "auto-rotation": this is the rotation that is induced by flexion.

If the forceps or ventouse are appropriately placed and if the axis of traction is correct, this will induce flexion, and this flexion will improve the confrontation between the head and the mother's pelvis, and the rotation will start again. This auto-rotation is not dangerous.

In case of a ventouse delivery, we only observe this type of rotation.

– "Active" rotation, also called "instrumental rotation": this is the rotation that is induced by the doctor via the forceps. **This rotation is sometimes performed during a forceps delivery. It must never be performed with a ventouse as it could lead to the foetal scalp being ripped off.**

The amplitude of this rotation must **never exceed 90 degrees.**

If it is performed gently and in a synchronous manner, there is little danger.

Question 129

(Traction) During an operative vaginal delivery, should passive rotation or active rotation be privileged?

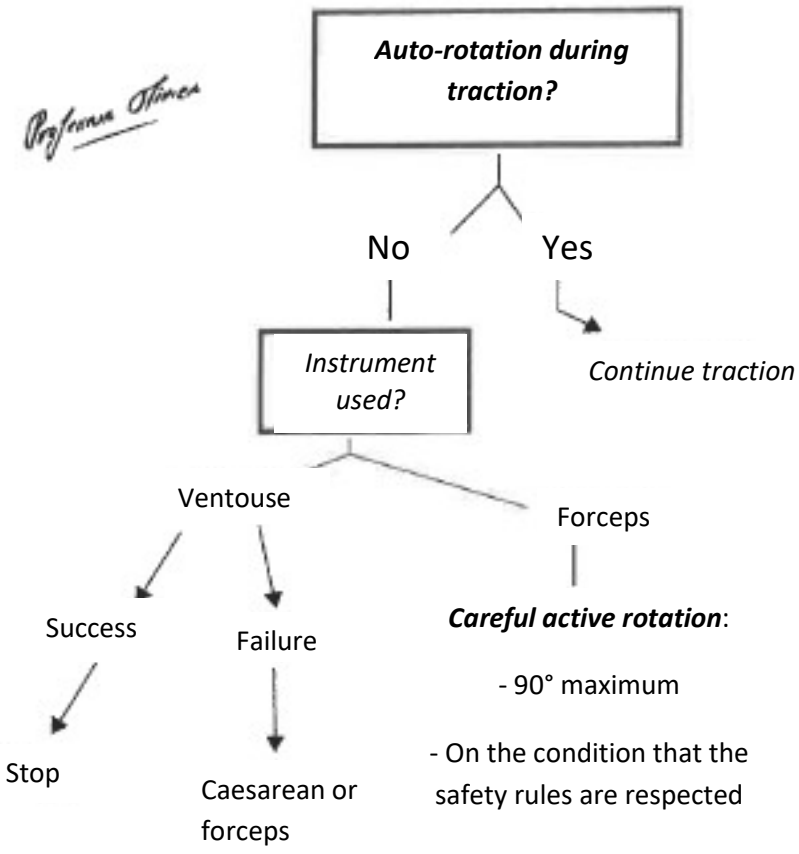
(Figure n°65)

This point is a point of essential safety.

The operator must position the extraction instrument in the right place (see Tome II) AND use an appropriate axis of traction (see question 125). This will induce flexion of the head, and this flexion in turn will induce rotation known as auto-rotation. By definition, this rotation takes place without the doctor having to apply any rotation movement to the instrument. This is the least dangerous rotation. Regardless of the instrument used, the rotation induced known as “passive” or “indirect” rotation or “auto-rotation” must be privileged.

In the case of forceps, we will see that we can also add, with the condition of knowing and respecting the rules of safety, an active rotation; any active rotation must be performed with caution (Figure n°65).

FIGURE N°65


Auto-rotation during traction?
No
Yes
Instrument used?
Continue traction
Ventouse
Forceps
Success
Failure
Careful active rotation:
- 90° maximum
- On the condition that the safety rules are respected
Stop
Caesarean or forceps

Question 130

In cases of traction with a ventouse or forceps, some doctors adopt the principle of maintaining the progression of the head during traction.

What does that mean?

During the first expulsive effort, the doctor pulls on the instrument then the patient finishes her first expulsive effort and catches her breath.

When the expulsive effort has ended, the doctor must block the instrument by holding it firmly to prevent the head from going back up into the pelvic canal. To do this, the doctor must block his elbow on his chest. After each expulsive effort and between each expulsive effort, it is necessary to maintain the progression of the head.

It is necessary to maintain the degree of traction at its minimum, that is at the amount of force that allows the head to not go back up while waiting for the next expulsive effort.

It should be noted that this point is used by the author but is not a consensual point.

Question 131

(Traction) During traction with a ventouse or forceps, there is one action that must never be performed by the doctor. Which one?

Explain why.

If this action is performed, indicate what complications can occur.

What dangerous action should be banished during traction, and applies to all instruments?

The doctor must never pull while moving alternatively to the right and left of the mother's plane of symmetry.

If you perform this action, that is, pulling with a ventouse or forceps first on the right, then on the left, this can lead to asymmetric application and dangerous mechanical traction forces. During traction, regardless of the instrument used, movements that lead the instrument first to the right and then to the left are forbidden.

Explanation

Performing this action reduces the surface of application of the forces and thus increases the pressure on the skull of the foetus. Effectively, **pressure (P) equals force (F) divided by surface (S): (P=F/S).** By reducing the surface of application of the force, this type of action increases the pressure imposed on the foetus' head.

Potential consequences of traction exerted right and left with a ventouse

This type of action leads to tipping the ventouse, of which only a semi-circumference remains in contact with the scalp while the other semi-circumference is detached. This can lead to detachment of the ventouse, tearing of the scalp, or both.

Potential consequences of traction exerted right and left with forceps

With forceps, this type of action will lead to distribution of the forces that is greater on one branch of the forceps and lower on the other. "Hard points" will appear, and they can result in lesions to the facial nerve or potentially serious lesions to the eyeball.

Question 132

During an operative vaginal delivery, an action must never be performed simultaneously by an aid. Which action?

Why?

Which action?

The action that must never be performed simultaneously is <u>pressure on the fundus</u>, that is, exertion of pressure with one or two hands by an aid on the abdominal wall of the patient, that is, on the fundus of the uterus.

Why?

This action is both useless and dangerous. From a biomechanical point of view, it does not improve the flexion of the head, does not initiate rotation, and can play a part in causing the foetus' shoulder to bang into the pubis, **aggravating shoulder dystocia**.

Performing this act can furthermore lead to **foetal trauma with fractures to the limbs or haematomas.**

This act must never be performed.

Question 133

(Traction) When using forceps or a ventouse, how many tractions can be performed?

Is there a specific number of tractions after which it is necessary to stop with forceps or the ventouse?

It all depends on how much the head has progressed:

– If the foetus' head is progressing, the number of tractions is not limited. In general, less than 6 tractions are enough to bring a child into the world.

– If the foetus' head is not progressing, the delivery must be stopped at the third traction.

After three traction efforts, if the head has not progressed, it is prudent to remove the forceps or ventouse and perform a caesarean.

- If the delivery is performed because of a significant anomaly in the foetal heart rate (FHR), a caesarean must be performed in "code Red" mode, that is, quickly and with the objective of birth within 15 minutes.

- If the delivery is performed because the progression of the head has stopped and there are no anomalies in the FHR, the caesarean is of the "code Green" type and the transfer to the operating theatre can be made non-urgently.

What you must not do:

Do more than three tractions when the head is not progressing.

Question 134

(Traction) During a ventouse or forceps delivery, should the intensity of the traction exerted by the doctor be constant?

Justify your answer.

The intensity of the traction should not be constant because the resistance is not constant.

It is important to understand that the force of the traction applied at a given intensity will, over time, first increase and then decrease in a manner that is inversely proportional to the resistance.

Start of the delivery: The doctor will gently increase the force applied until achieving the lowest force capable of allowing the head to progress (the force increases). The head will then descend into the pelvic canal. **The foetus' head finally passes through the barrier of the levator muscles of the anus, which will result in a sudden drop in resistance (see question 115, Figure n°58).**

If the doctor maintains intensity identical to the traction, the latter will lead to sudden progression of the head and a major risk of tearing the perineum, or even the external anal sphincter or the internal anal sphincter. Effectively, the head will progress suddenly, along with the foetus' shoulders, which will also progress suddenly. If the infant's shoulders pass through the perineum at the same time, a major perineal tear is to be feared.

It is important to retain that once the levator muscles of the anus have been passed, ideally the traction efforts should be stopped, and the patient should be asked to stop pushing.

– If the pushing efforts alone allow the head to progress, you should not hesitate to remove the forceps or the ventouse and free the head without an instrument.

– If the pushing efforts alone do not allow the head to progress, it is necessary to once again develop a force of traction that must be lower than the force previously developed.

<u>What you must not do</u>:

Use traction force of constant intensity. Effectively, once the head has passed the levator muscles of the anus, the resistance to the progression of the head will drop suddenly and that will lead to sudden progression of the head and a major risk of tearing to the perineum.

Question 135

To exert traction safely with an instrument, the traction must satisfy 8 criteria. What are they?

For traction with an instrument to be performed safely, it is necessary to respect the 5 following criteria:

- **The correct placement of the instrument on the foetus' head (see Tome II).**
- **The correct choice of axis of traction depending on the station of the head (see question 126).**
- **The correct position of the hands on the instrument (see Tome II).**
- **The quality of the synchronisation (see question 118).**
- **Verification of the progression of the head after 3 traction efforts.**

In the case of forceps, also:

- **The performance of an extra flexion action of the rolling type if the position is posterior (OP, LOP, ROP) (see Tome II).**
- **The correct choice of direction of rotation (clockwise or anti-clockwise) (see Tome II).**
- **The correct choice of amplitude of rotation (0; 45 or 90 degrees) (see Tome II).**

Question 136

(Traction) In summary, during an operative vaginal delivery with a ventouse or forceps, what are the three essential biomechanical mechanisms of the "motor" type that allow the foetus to progress?

There are three motor mechanisms that allow the foetus to progress:

– The first is quantitative and is linked to the *creation of a force of traction*

When this traction is synchronised with the AEF and VEF, it makes it possible to increase the driving forces and can make it possible to overcome the resistance (**see Figure n°62, middle**).

– The second mechanism is qualitative, the *gain in flexion*

If the extraction instrument is well positioned and the traction is performed on the correct axis, the operator will induce flexion in the head. Regardless of the extraction instrument used, the traction must result in the creation of a force situated at the centre of the figure. **The flexion of the head will reduce the diameter of the head as it is confronted with the pelvis and will thus decrease the resistance. This flexion will therefore allow the head to rotate in so-called "auto rotation".**

- The third mechanism is qualitative, *active rotation*, which is sometimes performed during a forceps delivery.

Question 137

During an operative vaginal delivery, is it necessary to perform an episiotomy and, if yes, when and what type of episiotomy?

The episiotomy is not systematic. It all depends on the degree of distention of the perineum.

If the perineum is distended and there is a risk of a tear appearing, it is desirable to perform an episiotomy to avoid tearing, the repair of which will in general be more difficult.

If the perineum appears loose and allows itself to distend without tearing, the episiotomy is not obligatory.

If an episiotomy is performed, it must always be of the left **mediolateral type**, and not median. Median episiotomies are dangerous: every study[22-26] has shown that they are a risk factor for tears to the external anal sphincter. They must thus be abandoned.

What you must not do:

Perform an episiotomy of the "median" type because this type of episiotomy multiplies by a factor of more than 10 the risk of tearing in the external anal sphincter[22-26].

Question 138

I have to perform an operative vaginal delivery, what instrument should I use?

(Figure n°66)

The first rule is to only use instruments when you are fully aware of how to use them.

The second rule is to differentiate urgent deliveries from non-urgent deliveries.

We recommend the following approach:

If the delivery is urgent: in cases of severe anomalies in the FHR of the bradycardia type:

- **First-line treatment:** forceps
- **Second-line treatment:** in the absence of progression after three tractions: Red code caesarean section (C-section).

If the delivery is not urgent: in case of stagnation of progression:

- **First-line treatment:** ventouse.
- **Second-line treatment:** forceps
- **Third-line treatment:** in the absence of progression after three tractions: Green code caesarean section (C-section).

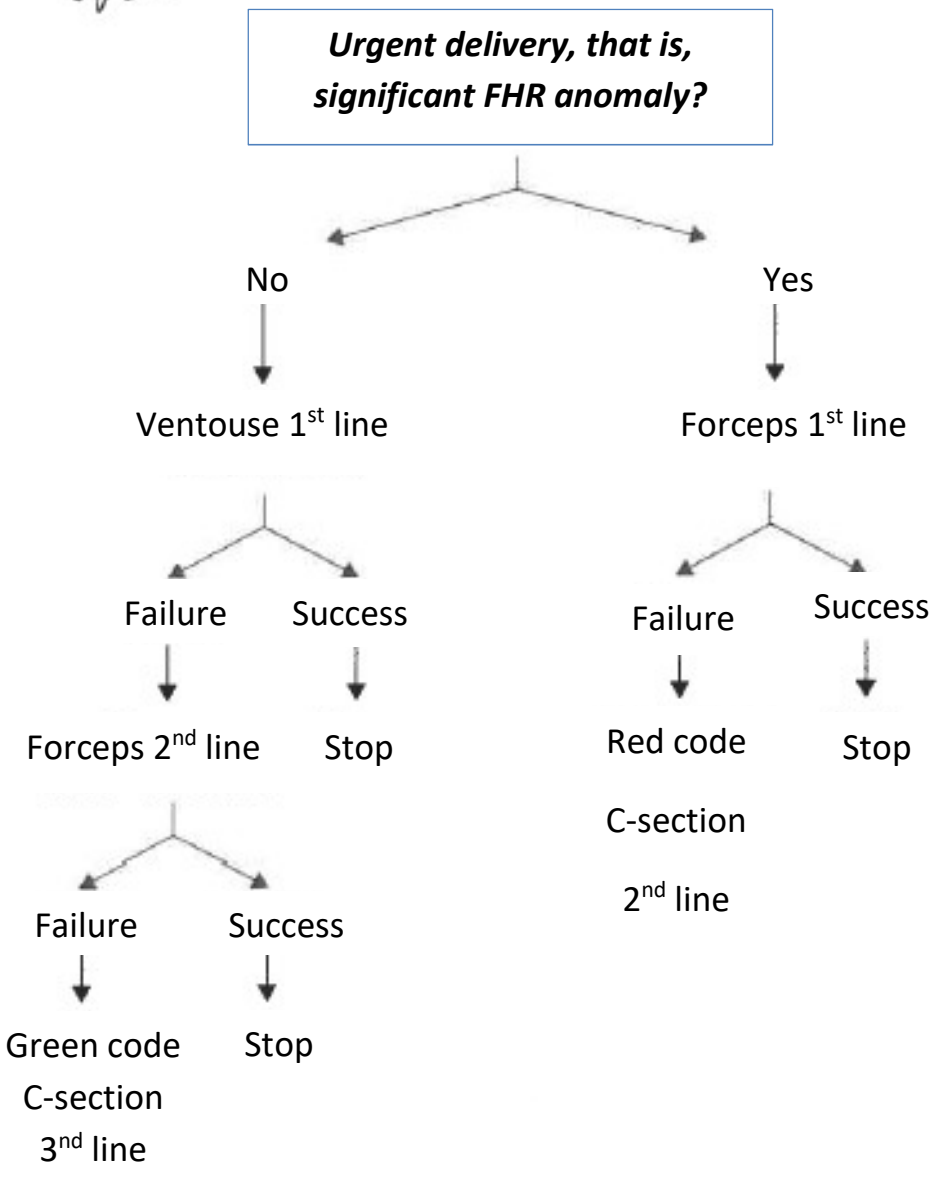
This course of action is recommended because of the greater risk of failure associated with the use of the ventouse[9]. Effectively, if the condition of the foetus is such that it suggests an onset of hypoxia, any delay can be detrimental. Failure with the ventouse will for this reason waste a few extra minutes that may be vital in urgent cases.

FIGURE N°66

What instrument

should I use ?

Professeur Ollinet



Question 139

In case of an operative vaginal delivery, once the foetus' head has been freed, that is, it is outside of the vulva, it is necessary to anticipate a possible complication.

What is it? Why? How can you prevent it?

Which complication should be anticipated?

Shoulder dystocia.

Why?

During an operative vaginal delivery, the head progresses more quickly than during a eutocic delivery. It is thus possible that the rotation movement of the shoulders does not have time to take place. In this case, the shoulders remain in an axis corresponding to the plane of symmetry of the mother, and the anterior shoulder risks blocking behind the pubis, leading to shoulder dystocia.

In addition, half of all forceps or ventouse deliveries are indicated because of foetopelvic disproportion, which naturally increases the risk of shoulder dystocia.

How can it be prevented?

To minimise this risk, once the head has been freed, it is necessary to:

1. Clearly tell the patient to stop pushing.
2. Wait for the next contraction before freeing first one shoulder, then the other. This waiting period sometimes allows the shoulders to turn in an oblique axis and to engage.

Question 140

You have just completed an operative vaginal delivery and shoulder dystocia has occurred.

What are the 5 principles that must immediately be implemented?

Explain the mode of action of each one.

(Figure n°67)

The 5 principles are as follows. They must be applied simultaneously:

1. Prevent expulsive efforts and tell the patient to stop pushing.

Be careful: in this situation of stress, the professionals present often forget this parameter and as a "reflex" tell the patient to keep pushing. Each expulsive effort will compress the anterior shoulder a little more against the pubis of the mother, and thus **aggravate the dystocia. "Push for the shoulders" is like "Brake on black ice" - a useless and dangerous reflex**.

2. Forbid manual fundus expression, that is, manual pressure on the mother's abdomen.

This action of putting manual pressure on the mother's abdomen above her navel will compress the shoulder against her pubis and **aggravate the dystocia**. Putting pressure on the mother's abdomen is **useless and dangerous.**

3. Implement hyperflexion of the mother's thighs on to her abdomen (operator n°1).

To perform this manoeuvre, called the McRoberts Manoeuvre, take each of the patient's feet in your hands and move closer to her, flexing her knees. This will result in flexion of the mother's thighs on to her abdomen.

This position must be maintained until the dystocia has been resolved.

This hyperflexion results in the pubis lifting 1 cm higher, which is sometimes enough to free the anterior shoulder, which can then slide under the pubis.

4. Orientation of the shoulders in an oblique plane (operator n°2).

For this, there are 2 solutions: either perform "suprapubic pressure" by placing two fingers just above the pubis and moving them from right to left, or left to right, to orient the foetus's anterior shoulder and move it out of the mother's plane of symmetry.
Or introduce two fingers into the vagina and push the foetus' back to reposition it in an oblique plane. When the back is in an oblique plane, the shoulders are obligatorily in an oblique plane and that will result in an oblique orientation of the shoulders. It should be noted that **we recommend the suprapubic pressure technique**.

5. Make the foetus "wipe its nose on its arm" (operator n°3).

Introduce the index and middle fingers of one hand into the vagina and press them against the foetus' arm to make it turn its arm as if you wanted the foetus the wipe its nose on its arm.

The rotation of the humerus will cause a displacement of the shoulder and back, which will move into an oblique position and be able to progress through the pelvic canal. In addition, this rotation will bring the arm, then the elbow, forearm, and hand, out of the vagina.

In our experience, simultaneous application of these 5 mechanisms resolves 100% of shoulder dystocia cases.

Simultaneously applying these 5 principles requires the presence of THREE people. This is why a forceps or ventouse delivery should NEVER be performed by one person alone.

It is thus recommended during a forceps or ventouse delivery that you recite these 5 principles in your head so that should the need arise, they can immediately be put into action.

These 5 principles can be represented in the form of a five-pointed star which ideally would be displayed in every delivery room (Figure n°67).

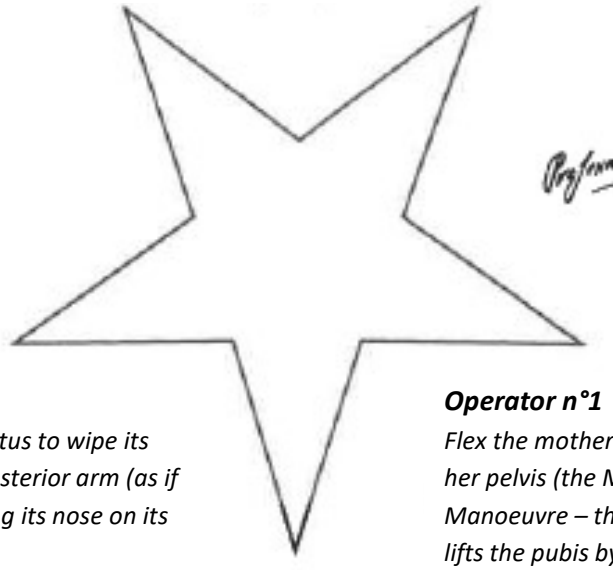
FIGURE N°67

The five pointed star

for shoulder dystocia

DO NOT PUSH
(Ask the patient to breathe through her mouth and prohibit the aide from asking the woman to push; expulsive efforts aggravate the situation by pushing the anterior shoulder into the pubis)

DO NOT PERFORM FUNDAL EXPRESSION
(Pressure on the uterine fundus aggravates the situation by pushing the anterior shoulder into the pubis)



Operator n°3
Vaginally, get the foetus to wipe its nose by turning its posterior arm (as if the foetus were wiping its nose on its arm)

Operator n°1
Flex the mother's thighs on to her pelvis (the McRoberts Manoeuvre – this manoeuvre lifts the pubis by 1 cm)

Operator n°2
Suprapubic shoulder orientation
=
Suprapubic pressure from right to left or left to right to unblock the anterior shoulder from the pubis

Question 141

After an operative vaginal delivery, in what order must you perform the two following acts: placenta delivery and repairs to the perineum?

Justify your answer.

The first step consists in checking to see if there is a haemorrhage from a vaginal tear or an episiotomy:

– If there is significant haemorrhage you must clamp the vessel, then deliver the placenta and then repair the perineum.

– If there is no significant haemorrhage, you deliver the placenta and then repair the perineum.

We recommend that you **perform systematically and first of all a "directed placenta delivery", that is, a slow intravenous injection of 5 units of oxytocin while delivering the shoulders (ie active management of the third stage) of the infant.**

There are then two situations:

A. In the vast majority of cases, the placenta will be expulsed **in the 5 minutes that follow the injection of the oxytocin, that is, in the 5 minutes following the birth.** The placenta and the membranes are then inspected: if the placenta is complete and not membrane-deprived, you can move on to the second stage of suturing the episiotomy and any tearing. If the placenta is not complete or if it is membrane-deprived, you must immediately perform a **uterine manual examination**.

B. **If the placenta has not been expulsed within 5 minutes of the birth, we recommend performing an artificial delivery of the placenta (ie a manual removal of the placenta) followed by a uterine manual examination**.

If an act such as a manual removal of the placenta or uterine manual examination is performed, make an intravenous injection of one dose of a 3rd generation cephalosporin.

Once the placenta has been delivered and the uterus is empty, the doctor can inspect the perineum and vagina. The perineum and vagina are carefully inspected to see if there any tears in the vagina or in the external anal sphincter. There are two aims here: to not leave any tears without sutures, and to not leave any dead space in the cavity, like in any other delivery.

Justification of this order: 1. Placenta delivery 2. Repair the perineum.

All the studies show that the rate of postpartum haemorrhage (PPH) is correlated to the delay in the "birth-placenta delivery". **The longer the time of this "birth-placenta delivery", the higher the rate of PPH**.

If you repair the perineum first, you waste time and increase the "birth-placenta delivery" time. In addition, in case of failure of the directed delivery of the placenta, you must perform an artificial delivery and uterine manual examination, that is, introduce the totality of one hand into the vagina and then the uterus, which risks putting the sutures already made on the perineum under stress, obliging you to redo them if the stitches break…

Question 142

If you administer an injection of 5UI of oxytocin while delivering the shoulders and then repair the perineum followed by the delivery of the placenta, explain in detail the mechanism of PPH that could occur.

(Figure n°68)

In the 5 minutes following administration of the injection of 5UI of oxytocin, the placenta will detach. If the doctor is repairing the perineum, no one should press on the fundus of the uterus to expulse the placenta. At T+5 minutes, the placenta is detached but remains in the cavity.

As the placenta has detached, the uterus will contract and retain the placenta, which is what we call an "**imprisoned placenta**". As "**only an empty uterus contracts**" correctly, and the uterus is not empty (it contains the placenta)… the uterine contraction is of poor quality and PPH can occur.

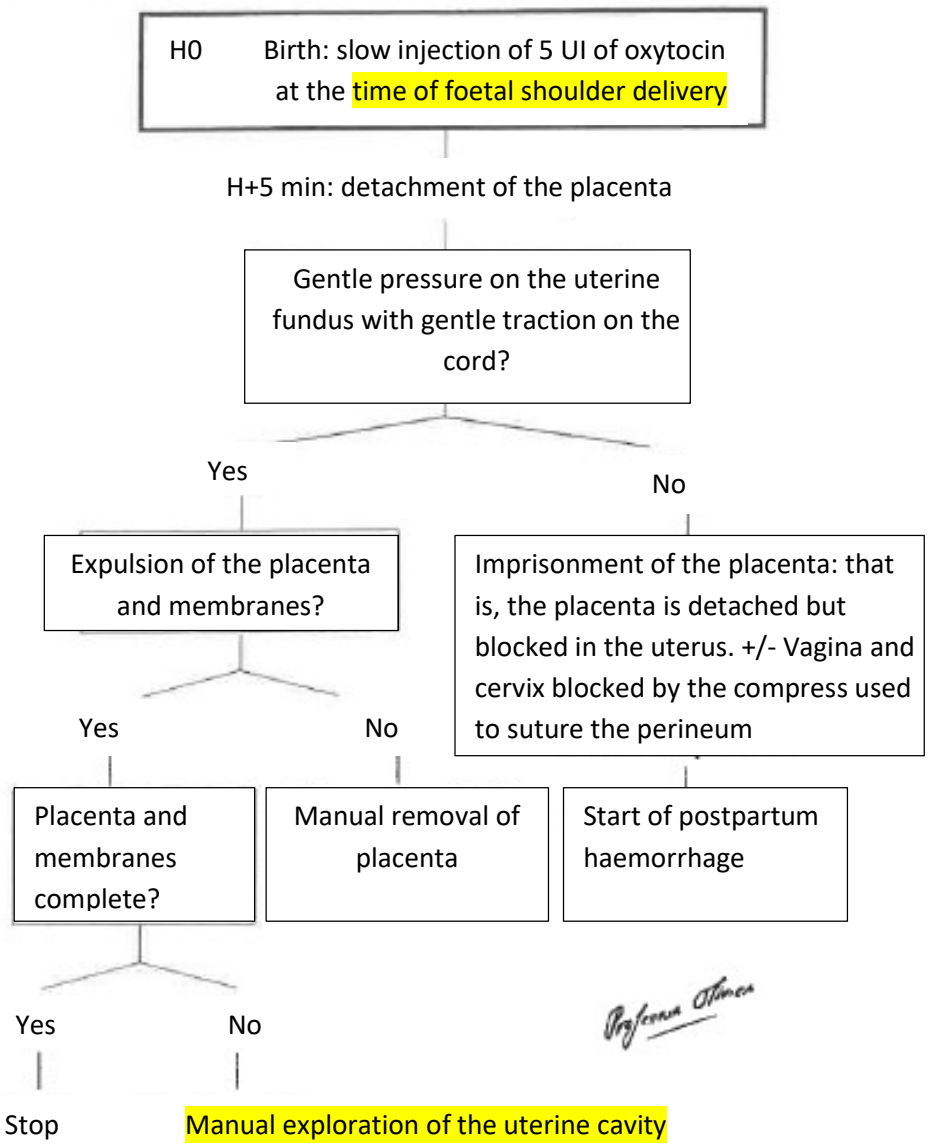
When the doctor during an operative vaginal delivery, or the midwife during a eutocic delivery, were suturing the perineum, he or she often placed a compress in the vagina. The compress prevents the uterus from emptying. The haemorrhage develops slowly but surely.

Once the perineum has been sutured, the professional removes the compress and notices the PPH.

This PPH could have been avoided if the professional had removed the placenta and membranes immediately after detachment.

Figure n°68 illustrates the PPH mechanism.

FIGURE N°68


H0 Birth: slow injection of 5 UI of oxytocin at the time of foetal shoulder delivery
H+5 min: detachment of the placenta
Gentle pressure on the uterine fundus with gentle traction on the cord?
Yes
No
Expulsion of the placenta and membranes?
Imprisonment of the placenta: that is, the placenta is detached but blocked in the uterus. +/- Vagina and cervix blocked by the compress used to suture the perineum
Yes
No
Placenta and membranes complete?
Manual removal of placenta
Start of postpartum haemorrhage
Yes
No
Stop
Manual exploration of the uterine cavity

Question 143

What is the objective of the "visual inspection of the cervix"?

Describe this action.

(Figure n°69)

The aim of this action is to verify if there is a cervical tear or a tear in the lateral vaginal vault.

This will allow the diagnosis of perineal, vaginal or cervical lacerations.

The visual inspection of the cervix consists in examining the cervix and lateral vaginal vaults by placing two right-angle vaginal retractors by an assistant while the obstetrician grasps the cervix with two triangular or ring forceps.

The obstetrician grasps the cervix with a heart-shaped forceps at 12 o'clock and the second at 3 o'clock. With the two forceps, the doctor then pulls gently on the cervix to expose the anterior and lateral left vaginal vault in search of any tearing.

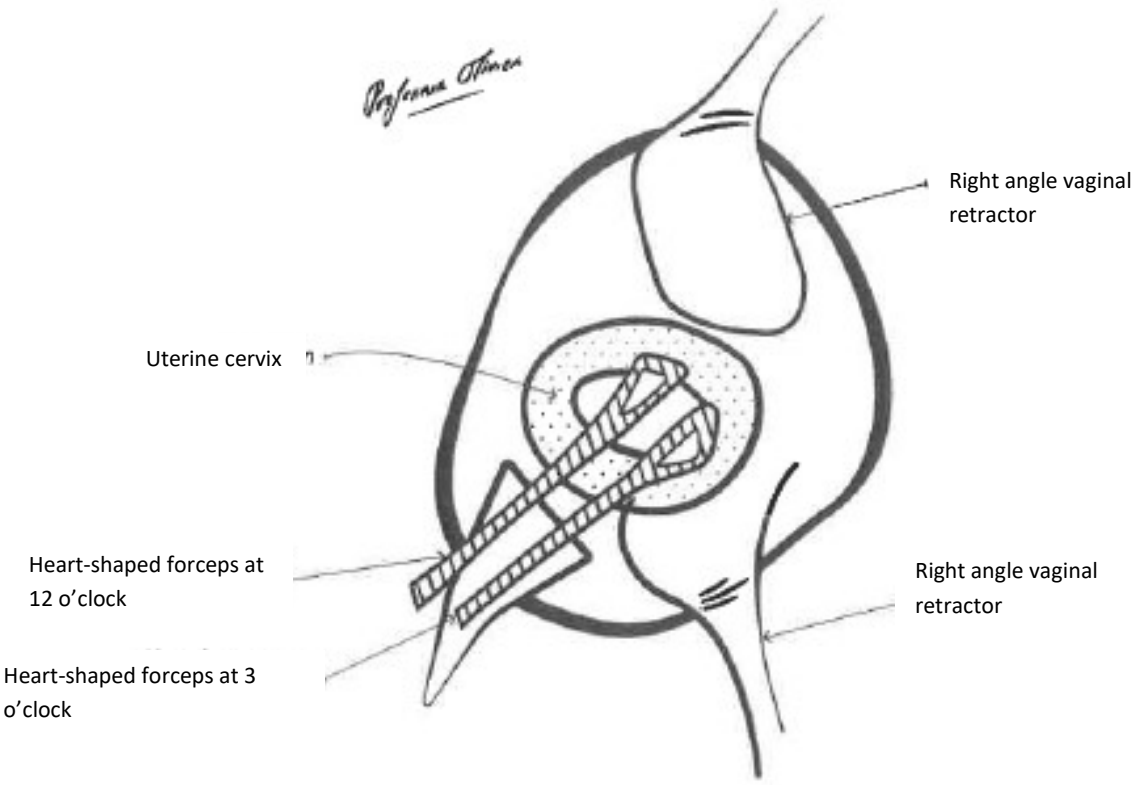
If there is a tear, it is sutured with vicryl 1. If there is no tearing, the forceps at 3 o'clock is left in position and the one at 12 o'clock is repositioned at 6 o'clock to expose the left lateral vault. If there is a tear, it is sutured with vicryl 1. If there is no tearing, leave the forceps at 6 o'clock and move the one at 3 o'clock to 9 o'clock.

The same action is repeated, and you thus turn to visualise the vaginal vaults, first the anterior, then lateral left, then posterior and then lateral right.

This action is shown in Figure n°69.

FIGURE N°69

Visual inspection of the cervix



This figure shows the initial position of the heart-shaped forceps. The forceps are then moved: the clamp at 12 o'clock is moved to 6 o'clock (see text)

Question 144

After an operative vaginal delivery, should a "visual inspection of the cervix " be performed systematically?

Justify your answer.

In our practice, the visual inspection of the cervix is not systematic.

It is performed in the following cases:

- Whenever **postpartum haemorrhage occurs**.

- Whenever the positioning of the forceps or ventouse was considered **difficult**.

- Whenever there is **vaginal tearing that exceeds half the depth of the vagina and the extremity of this tear is not clearly visible**.

- Whenever **active rotation of 90 degrees** has been made with forceps.

Question 145

In the immediate postpartum phase, are distended bladders common?

Justify your answer.

Yes. Distended bladders **are common** in the immediate postpartum period.

Effectively, whenever a woman who has just given birth is **under locoregional analgesia of the peridural or spinal analgesia type, she no longer feels the desire to urinate**. The anaesthesia of the bladder will remove her desire to urinate. The bladder will thus fill without the woman realising, and if no one pays attention, a distended bladder will develop.

Question 146

In the immediate postpartum phase, the development of a distended bladder has two negative consequences. What are they?

The development of a distended bladder has two consequences:

1. **It will compress the cervix and close the cervical canal. The closure of the cervical canal prevents the evacuation of the blood that has accumulated in the uterus, which will not only lead to a consumption of coagulation factors but will also prevent good contraction of the uterus which will in turn result in postpartum haemorrhage[6].**

You must learn by heart the three theorems related to postpartum haemorrhage:

"Only an open uterus will empty"

"Only an empty uterus will contract"

"Only a uterus that contracts will not bleed".

2. **In addition, the distended bladder can attain significant volumes, up to 600 ml or more, which can lead to a sprain in the bladder muscle (detrusor) and be a source of urine retention that can last for a few days, or even a few weeks.**

Question 147

After an operative vaginal delivery, is it necessary to put an indwelling urinary catheter in place?

No, indwelling urinary catheters are not used systematically.

They are used in the following cases:

- Whenever **postpartum haemorrhage occurs**.

- Whenever the positioning of the forceps or ventouse was considered **difficult**.

- Whenever there is vaginal tearing that **exceeds half the depth of the vagina, and the extremity of this tear is not clearly visible**.

- Whenever there has been **active rotation of 90 degrees** with forceps.

- **Whenever a distended bladder is detected**.

It should be noted that the indications for an indwelling catheter are the same for those of a visual inspection of the cervix, to which we can add distended bladders.

In these cases, we recommend leaving the indwelling urinary catheter in place for 24 hours.

In all other cases, it is necessary to carefully monitor the spontaneous return of miction.

What you must not do:

Fail to monitor the return of spontaneous miction, because effectively in this case, it is possible to neglect a distended bladder situation, which could in turn lead to postpartum haemorrhage and a lesion to the bladder muscle.

Question 148

After an operative vaginal delivery, is it necessary to systematically examine the head of the new-born? If yes, explain how.

Yes. An attentive examination of the new-born’s head must be performed systematically. It must include:

- a visual inspection of the skull;

- palpation of the entire surface of the skull.

Question 149

What are the two objectives of the examination of the newborn's head after an operative vaginal delivery?

A. TO SEARCH FOR ANY COMPLICATIONS FROM THE DELIVERY THAT REQUIRE MANAGEMENT OF THE NEW-BORN:

In case of a **forceps** delivery, you must search for the following, in decreasing order of severity:

- **A so-called "ping-pong ball" depression in the skull[7].**

To do this, it is important to pass your hand over the new-born's skull, looking for a small depression in the form of a cupula, called as a "ping-pong ball type fracture". This type of fracture will effectively only be detected with careful palpation of the skull. If it is present, a brain scan must be performed to screen for an associated haematoma or an intra-parenchymatous haemorrhage. These depressions are generally isolated and non-serious. The opinion of a paediatric neurosurgeon should always be requested to perform any repositioning of the bones.

- **Possible cutaneous marks on the face, forehead, eyelids, and eyes.**

If there is a mark on an eye or an eyelid, it will be necessary to schedule an examination by a paediatric ophthalmologist.

- **Facial paralysis.**

If there is any peripheral facial paralysis from a lesion to the facial nerve in proximity to the parotid, you must show the child to the paediatrician and ensure protection of the cornea. These facial paralyses regress in a few days. It should be noted that traumatic facial paralyses are unilateral.

In case of a **ventouse** delivery, you must search for the following in decreasing order of severity:

- **A subgaleal haematoma should be suspected systematically if the new-born has a large head. In this case, the opinion of a paediatrician should be sought urgently, as well as a coagulation work-up.**

- **A scalp wound that may require a suture.**

- **A cephalohaematoma, which is a haematoma facing one of the bones on the foetus' skull.**

B. DETERMINE THE DEGREE OF SYMMETRY IN HOW THE FORCEPS or VENTOUSE WAS POSITIONED AS A MEANS OF PERFORMING QUALITY CONTROL OF the INSTRUMENT PLACEMENT.

For **forceps**: the position should be transverse facial and symmetrical.

For **ventouse**: the centre of the small swelling must fall on the longitudinal suture and be situated 3 cm in front of the small fontanelle.

If the examination of the head shows that the positioning was not symmetrical, the operator must reconsider their positioning technique.

Question 150

After an operative vaginal delivery, should certain types of analgesic be preferred? Justify your answer.

Of the level 1 and 2 analgesics, we recommend using paracetamol (level 1) or tramadol (level 2). This can be used in the 2 to 4 days following the birth.

Beyond that, codeine can be prescribed for a short period of 3 days maximum.

We do not recommend the use of anti-inflammatories such as ibuprofen, ketoprofen, etc. which are undoubtedly effective, but can also increase the risk of infection. If anti-inflammatories are used, we recommend associating them with an oral antibiotic which is effective against gram negative bacilli and anaerobic bacteria.

What you must not do:

*Prescribe **anti-inflammatories drugs** to a patient with a risk of infection.*

Question 151

Is it necessary to systematically prescribe antibiotics after an operative vaginal delivery?

No. The prescription of antibiotics **is not systematic.**

It is recommended:

– if an endo-uterine act has been performed: such as **manual removal of the placenta or uterine manual examination.**

– if there is a **lesion to the external anal sphincter (whether it is partial or total), we always (except in case of allergy) implement prophylactic antibiotic treatment of the amoxicillin and clavulanic acid type, 1 g twice a day orally, for 10 days. The aim is to prevent infection in the sphincter repair as an infection could effectively lead to disunion of the scar and, in the long term, anal incontinence.**

Question 152

After an operative vaginal delivery, is it necessary to systematically produce an operating report?

Yes. Every operative vaginal delivery must be the subject of an Operating Report that includes the following elements:

– Patient: surname, first name, date of birth: ……..

- Number of previous vaginal deliveries: 0 / 1 / 2 / 3 / 4 / 5 / 6

- Number of previous deliveries via caesarean: 0 / 1 / 2 / 3 / 4 / 5 / 6

– Time in hours and minutes between the time the patient reached 4 cm of dilation and the time she was at full dilation: ……..

- Predicted Delivery Time: ……..

- Date and time at which the delivery was performed: ……

- Where the delivery was performed: Delivery room / Other ……

- Indication for the delivery: Progression stopped / Anomaly in the FHR / Mixed indication

- Sequence: Ventouse alone / Forceps alone / Ventouse then forceps / Other (describe): ……

- **Model of the instrument used**: Precisely: ……

- Analgesia: None / pudendal nerves / EA / spinal analgesia / peri-spinal / general anaesthetic / nitrous oxide / other …….

- Operator: surname, first name ……

- **Operator's title:** Resident / Assistant / Hospital practitioner / Hospital practitioner-University professor / Other …….

- Context = Colour code: (circle the code)

- "RED" (foetal bradycardia without recovery / suspected retroplacental haematoma / suspected uterine rupture / cord prolapse / eclampsia / maternal cardiorespiratory arrest)

– "GREEN" (progression stopped with no significant anomaly to the FHR)

– "ORANGE" (when it is neither red nor green)

– Time at which the operator was called for the delivery:……..

- Orientation of the head: Vaginal examination: OA / LOA / ROA / OP / LOP / ROP / ROT / LOT

Sign of the two fontanelles: not searched for / present / absent

Abdominal ultrasound performed? Yes / No

Ultrasound: OA / LOA / ROA / OP / LOP / ROP / ROT / LOT

- Position of the head: Vaginal examination: ACOG classification 0 / +1 / +2 / +3 / +4 / +5

Trans perineal ultrasound performed? Yes / No

If yes, distance foetal skull to mother skin in centimetres = "**FSK to MSK" distance:**…….

- Caput succedaneum: **Vaginal examination**: Absent / present / moderate / significant

Ultrasound: Thickness of the caput succedaneum in centimetres:

- Moulding: absent / moderate / significant

- Asynclitism: absent / anterior or posterior on an oblique type / right or left on a longitudinal type.

– Position:

Forceps:

- left branch (OA/OP): success / failure / DNA*

- right branch (OA/OP): success / failure / DNA*

- posterior branch (LOA/ROP/ROA/LOP): success / failure / DNA*

- anterior branch: (LOA/ROP/ROA/LOP): success / failure / DNA*

Ventouse: - ventouse cup: success / failure / DNA*

- Traction:

Number of tractions: …….

Quality of the synchronisation: excellent / mediocre / poor

Type of additional flexion: downward movement / rolling movement

- Rotation: None (OA, OP) / 45 degrees (LOA, ROA, LOP, ROP) / 90 degrees (ROP / LOP)

If rotation of 90°: second position: LOA / ROA

- In total: Vaginal delivery / Caesarean

- Episiotomy: No / left mediolateral / right mediolateral / median

- Vaginal tearing: No / Yes

- Cervical tearing: No / Yes

- **EAS tearing****: No tearing / partial tearing / total tearing

- Visual inspection of the cervix : performed / not performed

- Type of suture: describe precisely:

- Presence of the partner during the delivery: Yes / No - If no, why?

- Blood loss in ml:

- Shoulder dystocia: No / yes

If yes, clear description of the manoeuvres performed ……..

If yes: Fr clavicle / Fr humerus / Brachial plexus

- Infant:

- Weight in gr ……

- Term in weeks of amenorrhea and days ……..

-- Apgar at 1/3/5/7/10 minutes …….

--pH umbilical artery = ……..pH umbilical vein = …… Base defect …… / Lactates ……

-- Skin wounds: no / yes

-- Skin marks: no / yes. If yes, localisation ……

- Positioning of the instrument: symmetrical / asymmetrical

- Drawing with marks of the spoons (forceps) or position of the bump (ventouse)

- Cupula: no / yes

- Facial paralysis: no / yes

- Clear description of other trauma ……

- Positioning of an indwelling urinary catheter: No / yes

- Comments:

*DNA = Does Not Apply

**EAS = External Anal Sphincter

Question 153

Can a complication *in the mother* in a previous delivery, with or without instruments, have an impact on the choice of a future delivery method? What is this complication?

Justify your answer.

Yes. This complication is the **total rupture of the external anal sphincter (EAS).**

This rupture of the EAS is naturally the subject during childbirth of an immediate repair and prevention of any disunion through oral antibiotic treatment for 10 days.

A repaired EAS is more fragile, and this complication exposes the patient to an increased risk of **anal incontinence**.

Anatomically, it is the integrity of 3 elements that ensures anal continence:

- **the external anal sphincter (EAS)**

- **the internal anal sphincter (IAS)**

- **the levator ani muscle (LAM)**

The vascular and nervous elements that accompany these three structures are also essential.

During a vaginal delivery, with or without the use of forceps or ventouse, one or more of these anatomical structures (EAS, IAS, LAM) can be damaged and favour the development of anal incontinence.

Anal incontinence (AI) can take three forms, of descending severity:

- patent AI with solid stool

- patent AI with liquid stool or gas

- latent AI compensated for by levator muscles of quality.

It is essential to understand that in the case of latent AI, the levator muscles of the anus can compensate for failure in the EAS or IAS. It can thus be advantageous to preserve the muscle capital in the LAM.

In 2024, anal incontinence still does not have any effective treatment that can significantly alter quality of life.

This is why, after total rupture of the external anal sphincter, it is necessary to screen, via careful questioning, for any anal incontinence, however minor, with gas or liquid stool, and if it is present, we recommend discussing with the patient the possible performance of a caesarean for perineal protection to protect the capital of the levator muscles and pudendal nerves, and thus decrease the risk of anal incontinence.

Question 154

Can a complication *in the new-born* in a previous delivery, with or without instruments, have an impact on the choice of a future delivery method? What is this complication?

This corresponds to **neonatal trauma**.
If a previous delivery was complicated by significant neonatal trauma such as:

- a skull fracture;
- a subgaleal haematoma;
- eye trauma;
- a brachial plexus injury;
- a fracture of the humerus.

This list is non-exhaustive.

Each of these complications **must give rise to discussion of the possibility of performing a scheduled caesarean.**

This caesarean must be performed by an **experienced obstetrician**.

The scheduled caesarean has two objectives:

- prevention of a repeat of the previous neonatal trauma;
- prevention of psychological sequellae in the mother.

If a previous delivery was complicated by foetal death during labour, or at birth, or complicated by a neonatal ischemic encephalopathy, **we believe that this should give rise to a discussion of the possibility of performing a scheduled caesarean.**

Question 155

After an operative vaginal delivery, is it necessary to systematically see the patient at a post-operative consultation?

Justify your answer.

Yes. As with every surgical procedure, it is a good idea for the doctor who performed the operative vaginal delivery to see the patient again **approximately 4 weeks after the birth.**

During this consultation, it is necessary to:

1. Ensure that the operative vaginal **delivery report** has been given, if not give it to the patient.

2. Ensure that the mother **has fully understood why this type of delivery was performed.**

3. Examine the perineum. The clinical examination, the **speculum examination and vaginal examination** are to look for: possible disunion, a flap… and will assess the perineum. Depending on the results, you will prescribe **either physiotherapy or self-physiotherapy.** If the scarring is complete, it is possible to authorise sexual relations again.

4. Verify that the **most recent cervical smear test** was less than 2 years ago. If not, do one.

5. Verify that **uterine involution** has occurred correctly and perform a full examination with palpation of the breasts, blood pressure measurement and weight.

6. Ensure that an efficient **method of contraception** has been discussed with the patient and prescribed, and that she fully understands **what to do if she forgets to use it**.

Question 156

How long should a patient wait before taking up sexual relations again after childbirth in which there was tearing or an episiotomy?

The perineum usually heals in **3 weeks after delivery**. If there was an episiotomy or tearing, it is recommended that the patient avoid taking baths and having sexual relations for the 4 weeks following the delivery.

Four weeks after the delivery date, the patient can start having baths again, and take up sexual relations again.

Question 157

During the post-natal visit that follows an operative vaginal delivery, or a spontaneous vaginal delivery, the perineum is examined and three parameters concerning it are assessed. What are they?

During the post-natal consultation, you should verify the 3 following parameters:

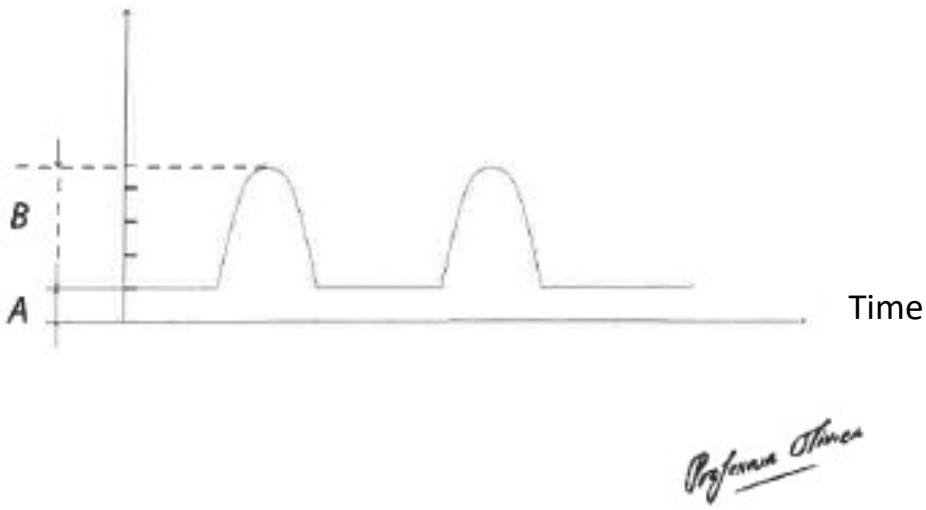
A. The **intensity of the contractions** of the levator ani muscles.
B. The **intensity of the muscle tone** of the levator ani muscles.
C. The capacity for **isolated** contraction of the levator ani muscles.

Question 158

Show on a graph, with the *x* axis for time and the *y* axis for force, the evolution in force at rest and evolution in force during two successive contractions of the levator ani muscles.

(Figure n°70)

FIGURE N°70



A – Basic tone value
B – Contraction intensity value

Evolution in the pressure linked to successive contractions of the levator ani muscles.

Figure n°70 shows evolution in the intensity of the force of the levator ani muscles over time.

During a vaginal examination performed with two fingers, we first assess the **baseline tone** in the muscles which normally is low (**Height A**), then we ask the patient to contract the muscles, that is, squeeze the doctor's fingers with the muscles in her vagina and we can then evaluate the **intensity of the contraction** (**Height B**).

Question 159

How do you assess clinically the contraction of the levator ani muscles (vaginal muscles)?

The contraction intensity of the levator muscles can be assessed during a vaginal examination performed with two fingers in a patient in the lithotomy position, and by asking her to squeeze your fingers intravaginally for 10 seconds.

The intensity of the contraction he feels is then graded from 0 to 5.

This is the classic "**grading of the levator ani muscles**".

Grade zero = no contraction felt

Grade 1 = contraction barely perceptible for one second

Grade 2 = contraction perceived but maintained for less than 5 seconds

Grade 3 = contraction perceived for 5 seconds but without resistance

Grade 4 = contraction perceived for 5 seconds with slight resistance

Grade 5 = contraction perceived for 5 seconds with strong resistance

After childbirth with or without operative vaginal delivery, the **grade** is often **1, 2, or 3**. And in these cases, re-education is a good idea: **self-re-education when the perineal command is good, or with a physiotherapist when the command is poor or inverted**.

When the grade is 4 or 5, which is rare, **self-physiotherapy is sufficient.**

Question 160

How do you assess clinically the intensity in the tone of the levator ani muscles (vaginal muscles)?

What are the 3 types of muscle tone possible?

Muscle tone is evaluated not during a contraction, but before or after a contraction. The tone is evaluated outside of a contraction during the phase of muscle rest. It is evaluated before or after testing the levator ani muscles.

There are 3 possibilities:

A. "Normal" tone in the levator ani muscles.

When the levator ani muscles have normal tone, the vagina allows two fingers to enter during the vaginal examination **with neither discomfort nor pain**.

B. "Hypotonic" levator ani muscles.

When the levator ani muscles are hypotonic, on inspection, the perineum is often gaping, with the labia minor not joined. Vaginal sensitivity is decreased.

The vaginal examination is performed with **neither discomfort nor pain**.

C. "Hypertonic" levator ani muscles.

When the levator ani muscles are hypertonic, the vaginal examination is disagreeable, painful, or even impossible. In extreme cases, we can even talk of "vaginismus", in which the vaginal examination or insertion of a speculum are impossible.

Question 161

What does the term “perineal command” mean, and how should it be shown clinically?

Explain the three types of perineal command possible.

The **perineal command** is defined by the **voluntary and isolated**, that is, on command, contraction of the levator ani muscles, and only the levator ani muscles.

The quality of the "perineal command" is tested by a vaginal examination combined with abdominal palpation.

When the patient is installed in the lithotomy position, the doctor performs a vaginal examination and inserts two fingers at the level of the middle third of the vagina, with the other hand placed flat on the patient's abdomen under the belly button. He then asks the patient to squeeze his fingers intravaginally.

There are then 3 possibilities:

1. "The good perineal command"

The doctor's intravaginal fingers are fully squeezed on request, and the patient does not contract her abdominal muscles. This is the ideal situation: the perineal command is good. The patient is aware of the muscles in her vagina and knows how to contract them on request. These women can do their **self-physiotherapy on their own at home**.

2. "Absence of perineal command".

The doctor's intravaginal fingers are not squeezed, and the patient does not understand what she is being asked to do. The perineal command is absent. This occurs in all women who are not aware of the muscles in the vagina (levator ani muscles) and who are thus not aware that it is possible to voluntarily contract these muscles. It is necessary to explain to them the anatomical position and functioning of these vaginal muscles and explain the notions of tone and voluntary contraction. These women **need perineal re-education**.

3. "Inversion of the perineal command":

The doctor's intravaginal fingers are not squeezed, and the patient contracts her abdominal muscles or lifts her buttocks. This is what is called "inversion of the perineal command". These women **need perineal re-education**.

Question 162

Exercise n°18.

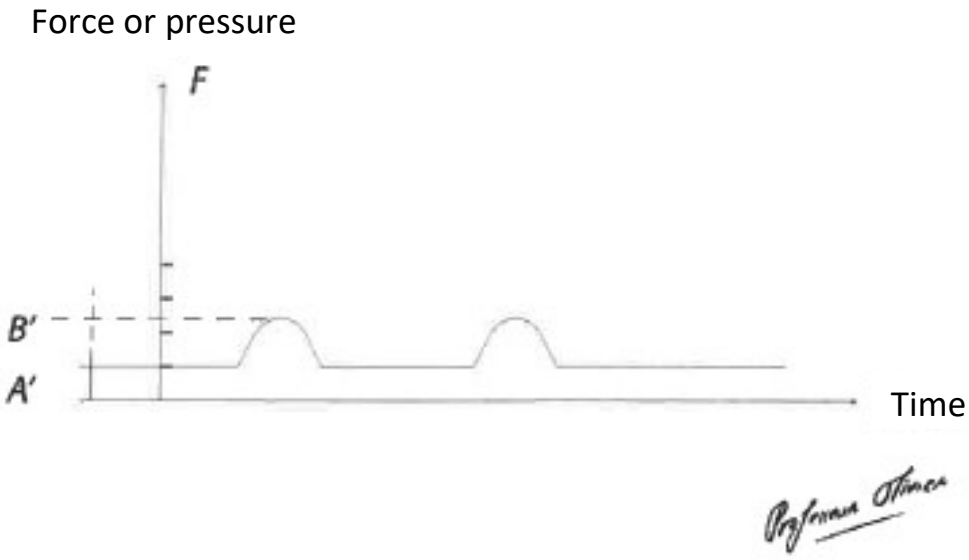
Figure n°71 shows what is seen by a doctor during a vaginal examination in which the patient has been asked to contract the muscles in her vagina.

Comment the diagram by comparing it to Figure n°70.

What kind of perineal physiotherapy would you prescribe?

(Figure n°71)

FIGURE N°71 **Exercice n°18**



Compare this graph to Figure N°70.
Comment on the values of A' and B' in relation to those of A and B.

On this graph, we can see that:

The baseline tone is normal: Height A’ is equal to Height A in Figure n°70.

The intensity of the contraction is low: Height B’ is lower than Height B in Figure n°70.

We would prescribe perineal physiotherapy with **learning and reinforcement of the contraction of the levator ani muscles**.

Question 163

Exercise n°19.

Figure n°72 shows what is seen by a doctor during a vaginal examination in which the patient has been asked to contract the muscles in her vagina.

Comment the diagram by comparing it to Figure n°70.

What kind of perineal physiotherapy would you prescribe to this patient?

(Figure n°72)

FIGURE N°72 **Exercice n°19**

Force or pressure

Time

Compare this graph to Figure N°70.
Comment on values A" and B" in relation to those of A and B.

On Figure n°72 we can observe that:

The levator ani muscle tone is abnormally high, which corresponds to a clinical situation of vaginismus with hypertonic muscles.

When the doctor asks for a contraction, he will perceive a slight increase in pressure.

In this case, you must prescribe **perineal physiotherapy with teaching of perineal relaxation and not muscle strengthening, which would just make the situation worse…**

Question 164

Is perineal physiotherapy systematic after an operative vaginal delivery?

As with after every childbirth, it is a good idea to assess the patient's perineum. The advice given should be adapted to each patient.

– If the command to the levator ani muscles is good and the perineum is not hypertonic and the contraction of the muscles is satisfactory, you should explain to the patient what exercises to do at home. She can then do her own **self-physiotherapy**. This self-physiotherapy consists in doing a series of 10 contractions/relaxations of the levator ani muscle, at least twice a week, ideally every day. Each contraction should be maintained for 10 seconds. Ideally, this muscle maintenance should be for life.

– If the command to the levator ani muscles is good and the perineum is hypertonic

Physiotherapy is important, and we prescribe sessions of perineal physiotherapy in **relaxation** mode in which the patient will not learn how to contract her muscles, but rather relax them. Once she has fully understood the exercise, she should be encouraged to repeat it at home.

– If the command of the levator ani muscles is non-existent or inverted

Physiotherapy is very important, and we prescribe at least 12 physiotherapy sessions with a physiotherapist, after which we would then prescribe the self-physiotherapy described above.

Question 165

List the contraindications for operative vaginal deliveries and explain briefly the reasons.

Contraindication linked to the mother:

– Incomplete cervical dilation (risk of cervical tearing and postpartum haemorrhage).

– Past history of full tearing of the external anal sphincter with residual anal incontinence (risk of aggravating the anal incontinence).

– Agitation in the mother (increase in tone of the levator ani muscle, which increases resistance, and poor synchronisation, making it necessary to increase the intensity of the instrument expulsive force).

– Refusal by the mother (poor synchronisation making it necessary to increase the intensity of the instrument expulsive force).

Contraindication linked to the newborn:

– Unknown cephalic station (see the symmetry theory).

– Unknown cephalic position (see the symmetry theory).

– Head not engaged (see the symmetry theory).

– Past history of neonatal trauma in a previous operative vaginal delivery.

– Estimated foetal weight > 4500 g in a diabetic mother.

– Estimated foetal weight > 5000 g in a non-diabetic mother.

- For forceps: ***- transverse type*** *(see the symmetry theory).*

– For ventouse: ***face presentation,***

delivery of the after-coming head in breech presentation

gestation less than 36 weeks

infant at significant risk of bleeding disorders such as thrombopenia or haemophilia.

Mother under general anaesthetic,

Contraindication linked to the mother and the newborn:

Cephalopelvic disproportion with overlap of the bones of the skull or a large caput succedaneum, or significant lateness in relation to the Predicted Delivery Time.

This contraindication is particularly important.

Mixed contraindication linked to the practitioner:

- Insufficient training

- Lack of supervision of the first 50 operative vaginal deliveries.

Question 166

What is the impact of stress on an obstetrician's knowledge?

In case of stress, the doctor only has partial access to his knowledge. If there is significant stress, the doctor can lose all his knowledge.
This is why all obstetricians should know the method that allows them to decrease their stress… (see Question 167).

Question 167

What is the most effective technique for reducing stress?

The most effective technique is **mental anticipation.**

- The technique involves mentally representing the scene and putting into words the actions that will be performed to deal with the situation.

- The operator closes his eyes and puts into words the actions he will perform 5 or 10 minutes before actually performing them.

Question 168

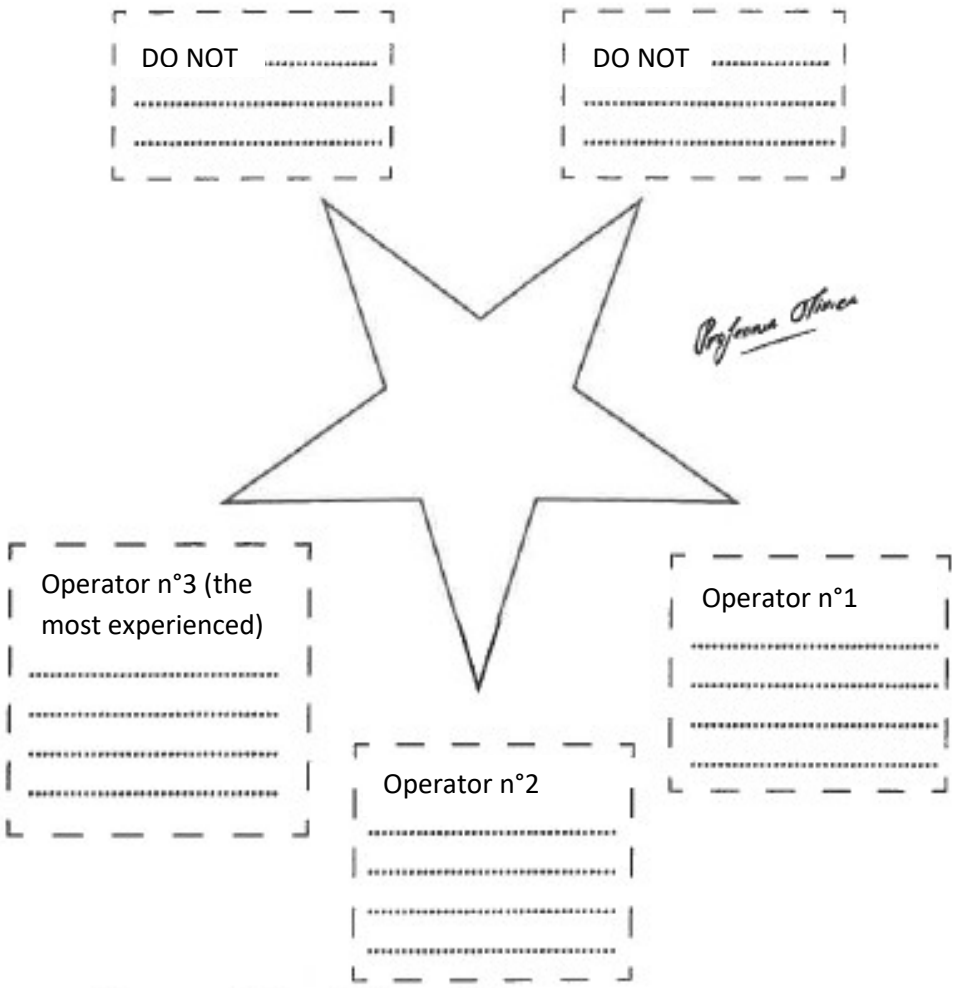
Exercise 20

Complete the five pointed star diagram for shoulder dystocia shown in Figure 73.

(Figure n°73)

FIGURE N°73 **Exercice n°20**

Complete the five pointed star diagram in less than 60 seconds



(Answer: see Figure n°67, page 340)

Question 169

During a birth, how can you mentally anticipate shoulder dystocia?

The doctor must close their eyes and rapidly repeat the five elements in the “five pointed star diagram for shoulder dystocia”. If dystocia occurs in the minutes that follow, the operator will have the 5 actions that need to be performed simultaneously available at the forefront of their memory.

They will then be able to deal with the situation, overcoming their own stress, that of the rest of the team and of the pregnant woman.

Question 170

Three months after the birth, Ms X complains of urinary incontinence (UI).

Indicate the two types of urinary incontinence that need to be looked for.

Indicate the impact of surgery on these two types of urinary incontinence.

- It is essential to differentiate UI because of **instability**, also known as “urgenturia” (meaning an urgent need to urinate), from **effort UI**, which occurs when the patient coughs, plays sport or carries something heavy…

- More than 90% of UI cases that occur during pregnancy disappear within a maximum of 6 months following the birth. There is therefore no need to perform surgery in the first 6 months postpartum.

- More than 6 months after the birth, effort UI can be the subject of medical treatment through re-education of the levator ani muscles, and sometimes a surgical treatment if the discomfort is significant. On the other hand, UI caused by instability is often aggravated by surgery and must thus be treated medically.

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Answers to the Exercises

Exercise n°1 (page 17)

Answer = The plane of symmetry of the mother is plane “A” in the figures on pages 17 and 18

Exercise n°2 (pages 19; 20)

Answer = Figure n°8, page 21

Two fontanelles and six sutures should be placed

Exercise n°3 (page 28)

Answer: bregma = “1” in Figure n°9

(1 = bregma = large fontanelle; 2 = lambda = small fontanelle)

Exercise n°4 (pages 38; 39)

Answer: Galea = marker “C” on Figure n°12

(A = epidermis; B = hypodermis; C = galea; D = periost.; E = bone)

Exercise n°5 (table on page 42)

	First phase of labour	**Second phase of labour**	**Third phase of labour**
Start	Time at which labour started	Time at which full dilation was attained	Time of birth
Finish	Time at which full dilation was attained	Time of birth	Time at which the placenta was delivered

Exercise n°6 (page 50)

x axis = time in hours

y axis = dilation of the cervix in centimetres

Point A = time at which the patient attained 4 cm of dilation

Point B = time at which the patient attained full dilation (10 cm)

Point C = time of birth

Point D = time at which the placenta was delivered

The whole = partogram (see Figure n°15, page 51)

Exercise n°7 (page 88)

Answer = Moulding / Caput succedaneum / Asynclitism

Exercise n°8 (question: page 106/answer: pages 107 and 412)

PDT = 9 am.

High risk of foetopelvic disproportion.

This is not a contraindication but does make great caution necessary (see pages 107)

Exercise n°9 (question: page 108/answer: pages 109 and 412)

PDT = 11 pm

Low risk of foetopelvic disproportion.

Operative vaginal delivery authorised as long as procedures are respected.

Exercise n°10 (question: pages 137-38/answer: pages 117 and 412)

Stage 1: What is the **station** of the foetus' head?

Stage 2! What is the **position** of the foetus' head?

Stage 3: **Has the ventouse or forceps been put into place symmetrically**

Other boxes: see page 117.

Exercise n°11 (question pages 168 and 169/answer: page 412)

Answer: Engaged level +3

Exercise n°12 (question: pages 208 and 209/answer: page 414)

Answer see Figure n°41, page 414.

Exercise n°13 (question: pages 212 and 213/answer: page 415)

Answer see Figure n°43, page 415.

Exercise n°14 (question: pages 222 and 223/answer: page 224)

Answer see Figure n°45, page 224.

Exercise n°15 (question: pages 244 and 245)

Answer: see Figure n°53, page 245, and page 246.

Exercise n°16 (question: pages 285 and 286/answer: pages 287 and 288)

Answer pages 287 and Figure n°60, page 288

Exercise n°17 (question: pages 289 and 290/answer: page 291 and Figure n°62, page 292)

Answer page 291 and Figure n°62, page 292

Exercise n°18 (question: pages 388 and 389/answer: page 390)

Exercise n°19 (question: pages 391-and 392/answer: page 393)

Exercise n°20 (question: pages 403)

Answer see Figure n°67, page 340.

FIGURE N° 41

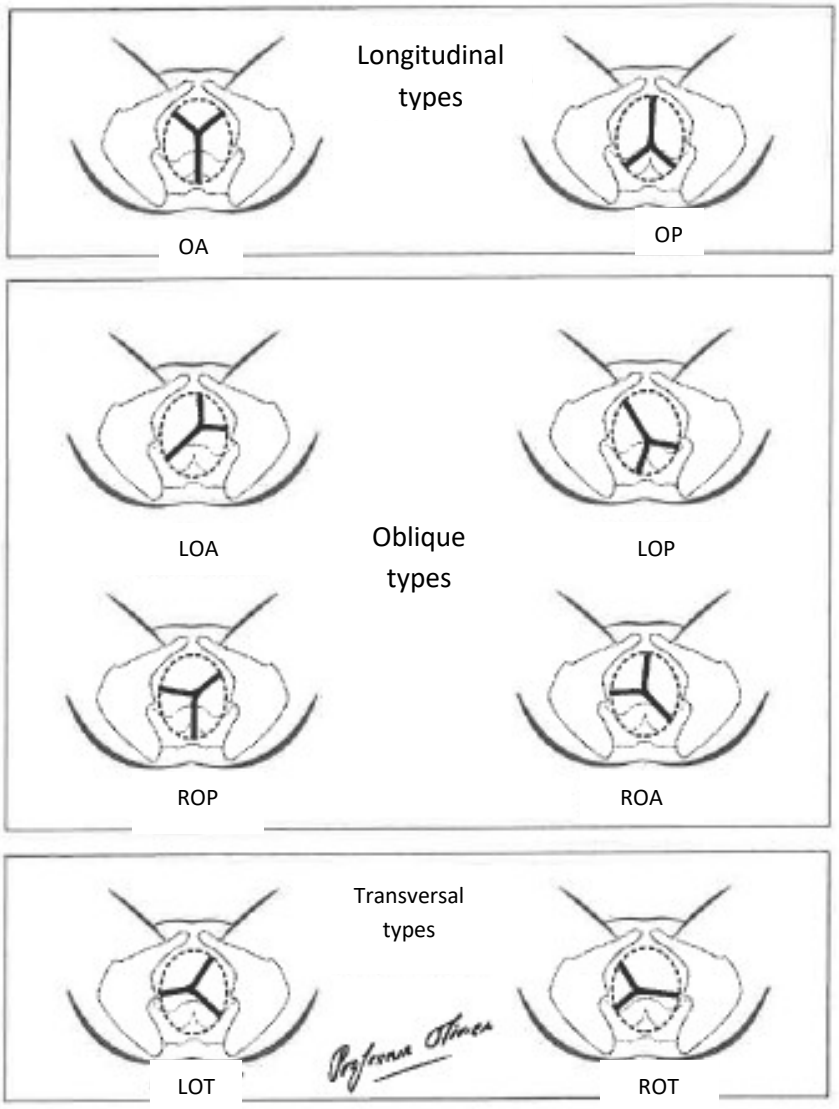
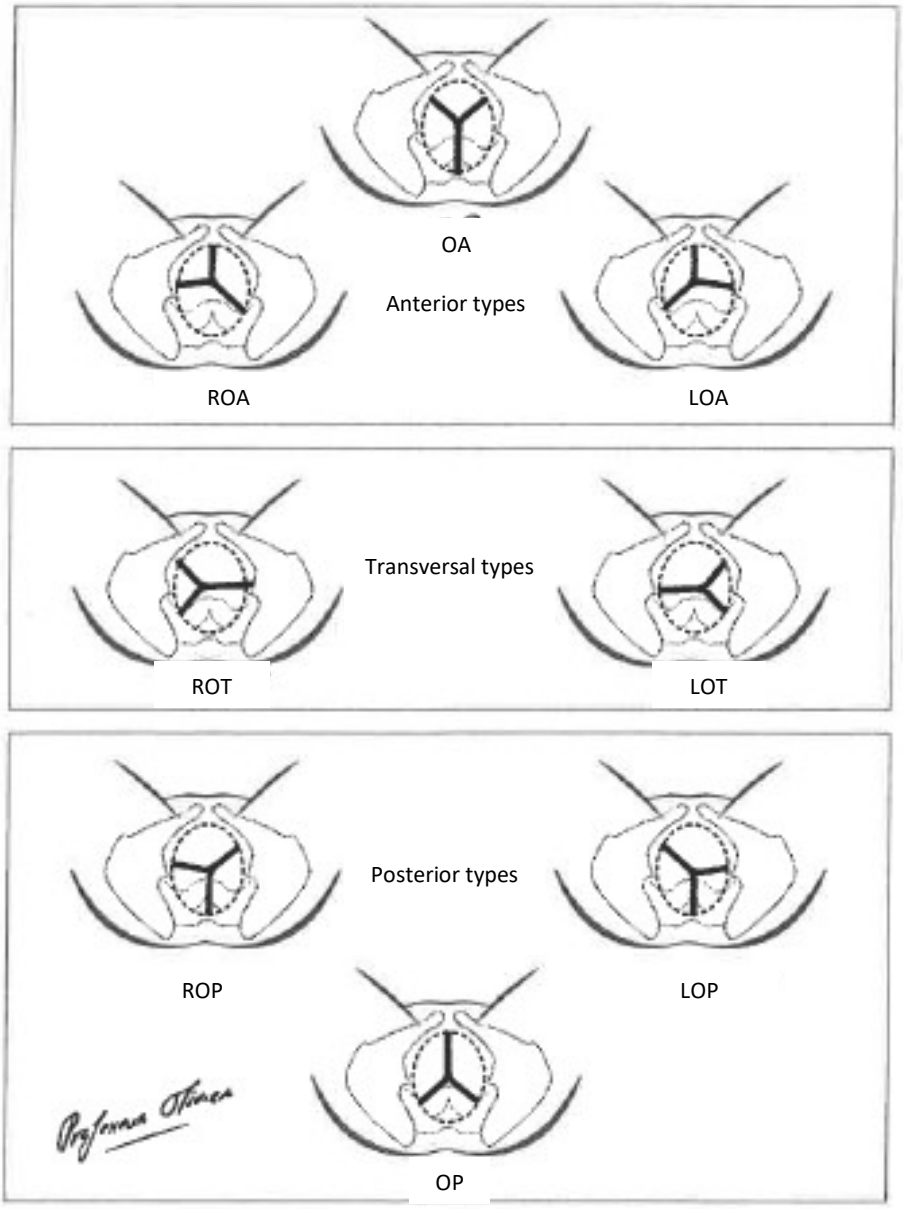

Longitudinal types
OA
OP
LOA
LOP
Oblique types
ROP
ROA
Transversal types
LOT
ROT

FIGURE N° 43


OA
Anterior types
ROA
LOA
Transversal types
ROT
LOT
Posterior types
ROP
LOP
OP

LIST OF ABBREVIATIONS

AD	Artificial delivery
AEF	Automatic expulsive force
AI	Anal incontinence
DD	Directed delivery
DNA	Does not apply
EA	Epidural analgesia
EAS	External anal sphincter
FHR	Foetal heart rate
FHRA	Foetal heart rate anomaly
FPD	Foetopelvic disproportion
FSK-MSK	Foetal SKull to Maternal Skin (FSK-MSK)
IAS	Internal anal sphincter
IEF	Instrumental expulsive force
LAM	Levator ani muscle
LOA	Left occiput anterior
LOP	Left occiput posterior
LOT	Left occiput transverse
OA	Occiput anterior
OP	Occiput posterior
OVD	Operative vaginal delivery
PDT	Predicted delivery time
PPH	Postpartum haemorrhage

ROA	Right occiput anterior
ROP	Right occiput posterior
ROT	Right occiput transverse
SD	Shoulder dystocia
SVD	Spontaneous vaginal delivery
UC	Uterine contraction
UI	Urinary incontinence
UME	Uterine manual examination
VE	Vaginal examination
VEF	Voluntary expulsive force