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HOW I DO IT - NEUROSURGERY GENERAL

A modified park bench position: the "Dormeuse" position

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Abstract

Background Because of the restricted volume of the cisternal space, proper patient positioning on the operating table is of utmost importance during surgery by retrosigmoid approaches. Three positions are commonly used: supine, with the head rotated to the side contralateral to the lesion; the semi-sitting position; and the park bench position. Each position has advantages and disadvantages, and the surgeon should choose the one best suited to the individual patient and the pathology to be treated.

Methods We describe a modified park bench position that we call the *Dormeuse* position.

Conclusion The *Dormeuse* position guarantees decrease in the posterior fossa pressure and allows optimal neural and vascular manipulation and control of any aspect of the cerebellopontine angle.

Keywords Retrosigmoid · Cerebellopontine angle · Positioning · Craniotomy · Skull base

Relevant surgical anatomy

The *Dormeuse* position (DMP) derives its name from the famous 1809 painting by Jean-Auguste-Dominique Ingres *La Dormeuse de Naples* (Fig. 1). Basically it is a park bench position (PBP) with two key modifications: (1) the thorax is elevated and (2) the head is rotated toward the side of the lesion, as in the semi-sitting position (SSP). Thus, the *Dormeuse* position combines some of the features of both PBP and SSP. As in the SSP, having the head above the heart markedly decreases posterior fossa pressure (Fig. 2 and video) and, in addition, causes the cerebellum to fall away from the petrous bone and the tentorium, facilitating manipulation of delicate structures. As in the PBP, having the patient on one side allows the surgeon to be more comfortably positioned and permits easier control in case of air embolism. At the first alert of possible air embolism, the operating table can be shifted to the horizontal position within few seconds.

Description of the technique

The patient is intubated in the supine position and then rolled over on to the side contralateral to the lesion. The contralateral arm is placed on an arm holder, with care taken to avoid pressure on the armpit and thereby on the brachial plexus. Before the head is fixed in the head clamp, three maneuvers are necessary to exploit the advantages of the DMP. First, the head section of the operating table is elevated by about 30° so that the thorax is clearly higher than the feet. Second, the knees and hips are gently flexed, and a pillow is placed between the knees; the legs are also slightly raised by placing pillows under them or by elevating the leg section of the operating table. Third, during head fixation by the three-pin head holder, the head is kept in the same axis as the thorax without any lateral bending, but is rotated toward the side of the craniotomy and flexed slightly forward as in the

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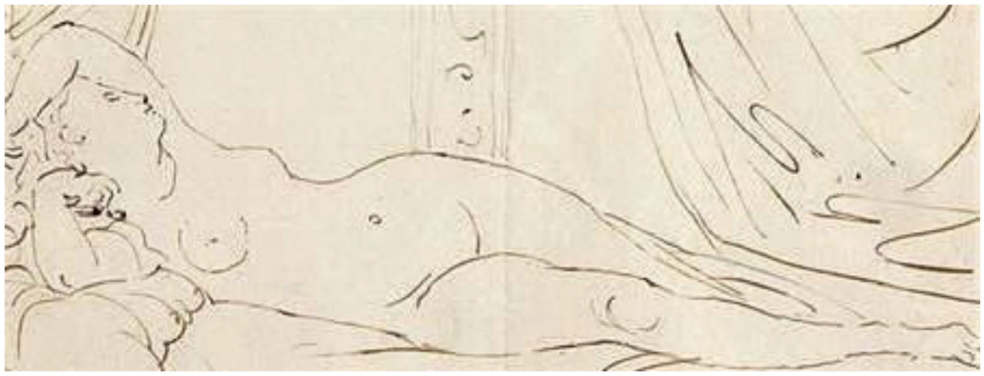

Fig. 1 Reproduction of the painting *La Dormeuse de Naples* by Jean-Auguste-Dominique Ingres (1809) (from Wikipedia). Note how the thorax of the subject is elevated and the head turned toward one side; these are the two basic features of the *Dormeuse* position

SSP (Figs. 2 and 3). Some modifications in rotation or forward flexion can be made, depending on the exact location of the pathology.

With this position, the surgeon works in front of the cerebellopontine angle, with an almost parallel axis compared to that of the petrous bone (Fig. 3). The retrosygmoid approach is then carried out in the usual fashion. Because the cerebellar hemisphere falls away from the petrous bone and the tentorium in this position, the self-retaining retractor can be avoided (see video).

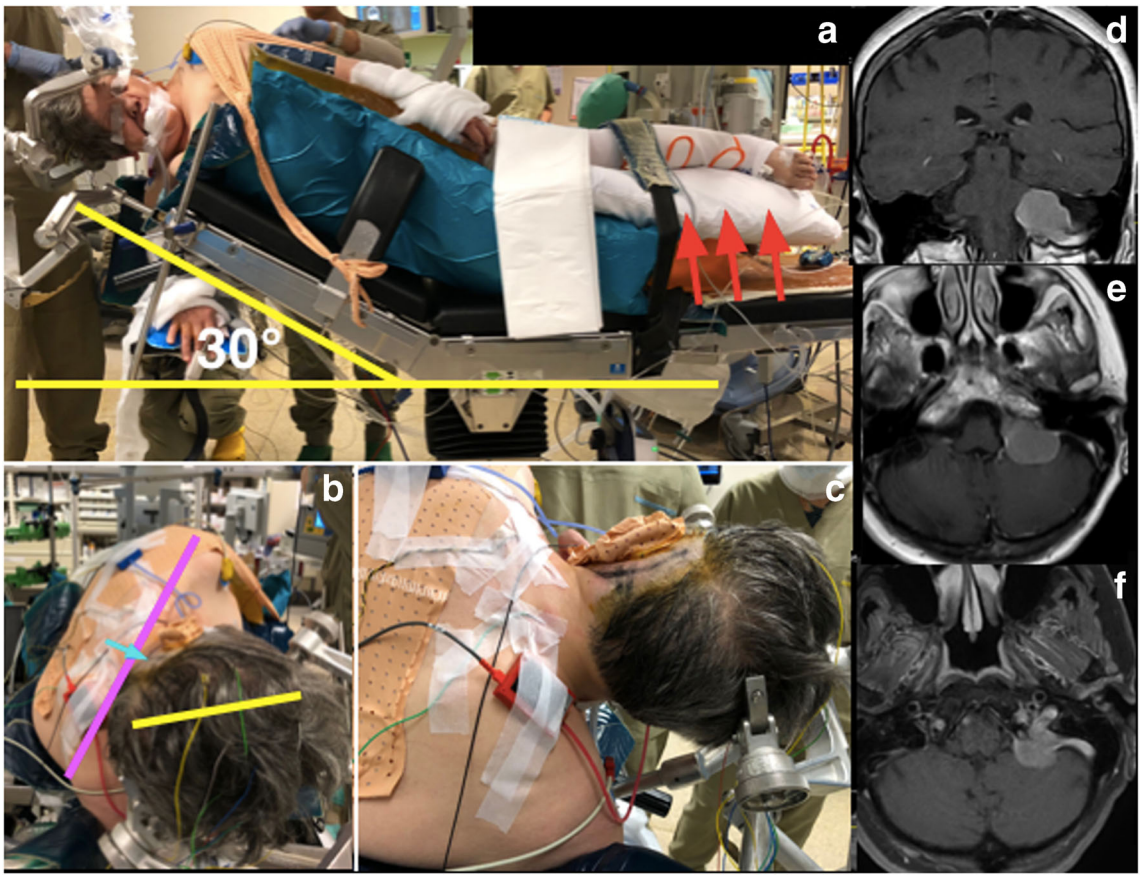

Fig. 2 The key points of the *Dormeuse* position. **a** The head section of the table is elevated by approximately 30°. The legs are flexed and raised by elevating the leg section of the table or by using pillows. **b** In the park bench position, the ipsilateral shoulder is pushed forward and kept along the body; the head is turned toward the side of the lesion as demonstrated by the yellow line (head midline) and purple line (shoulders axis). The turquoise arrow indicates the surgeon's point of view. **c** Final position; note the rotation of the head toward the side of the lesion. **d**, **e**, **f** Preoperative MRI showing a left cerebello-pontine angle meningioma attached on the dura of the jugular foramen

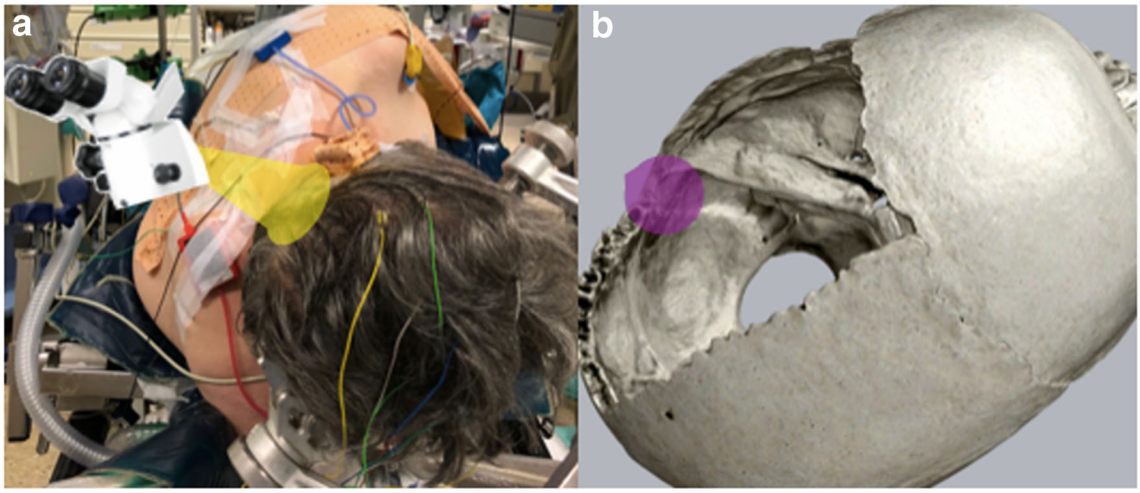

Fig. 3 **a** Projection of the microscope view. **b** Computer graphic of the skull and petrous bone demonstrates that the surgical corridor through the cerebellopontine angle is almost in front of the surgeon. The surgeon should ideally be seated on a chair with an arm rest (this image is provided courtesy of UpSurgeOn.com)

Indications

The *Dormeuse* position can be used to treat lesions located anywhere in the cerebellopontine angle. Specifically, the excellent venous outflow and the consequent substantial decrease in the intracranial pressure plus the spontaneous fall of the cerebellum away from the petrous bone and the tentorium permit easy manipulation of structures, almost comparable to that achieved in SSP. Hence, the position is particularly suitable for anteromedial (petroclival) lesions or those extending beyond the tentorial notch (Fig. 4). However, just by rotating the microscope downward, lesions around the foramen magnum or the jugular tubercle can also be easily managed (see video). Patients with large tumors or tumors with predictable bleeding are good candidates for this position.

Limitations

Since the DMP is a combination of concept derived from SSP and PBP, the surgeon should be familiar at least with the PBP to avoid any complications related to malpositioning. Not all the surgeons are comfortable with having the operating field in front, rather than under, the microscope light [7]. More, to better exploit the advantages of this position, it is advisable for the surgeon to sit on the operating chair but many surgeons prefer to stand up during surgery. A possible compromise is to

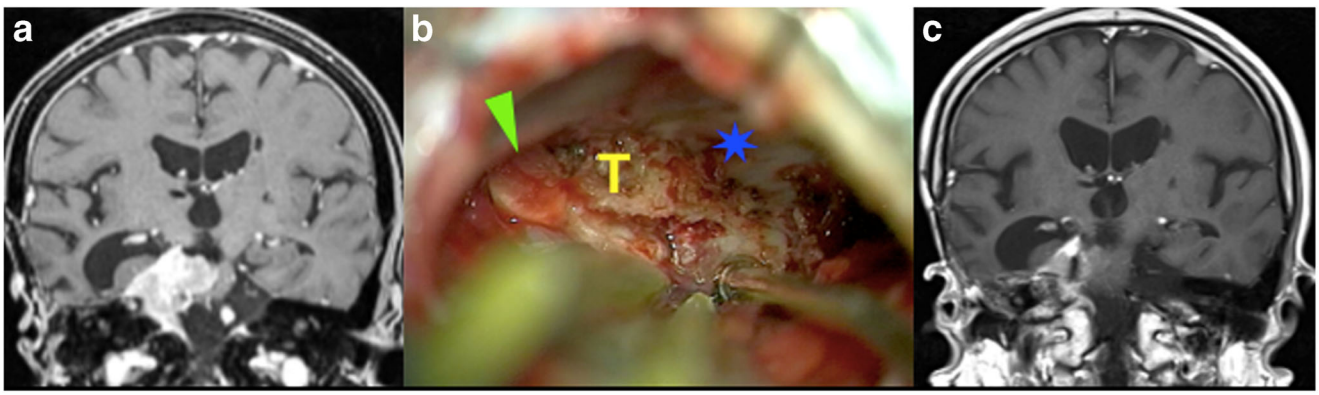

Fig. 4 **a** Preoperative gadolinium-enhanced MRI of a patient with a relapse of petro-tentorial meningioma treated earlier with surgery (via a subtemporal approach) and radiotherapy. **b** Intraoperative view. Retrosigmoid approach with the patient in the *Dormeuse* position. Note the good exposure of the supracerebellar space until the tentorial notch (green triangle: tentorial notch; T, tumor; blue star, tentorium). **c** Postoperative MRI showing subtotal resection

push the operating table up at a point where the surgeon avoid sitting.

How to avoid complications

The *Dormeuse* position is basically a modified PBP and hence the precautions are the same as in the latter. Specifically, pressure points must be avoided by proper positioning of the body and limbs and by use of pillows or gel pads [5, 9]. Most importantly, damage to the brachial plexus must be avoided by proper positioning of the shoulder and armpit [6]. There is the possibility of air entering the veins [3]. Although the cranial venous outflow is favored by the higher position of the head relative to the heart, we maintain that the risk of air embolism is much lower than in the SSP or even virtually absent [8]. However, compressing jugular veins at the neck can help identifying if intracranial veins are empty with the risk of air penetration.

Pneumocephalus is the norm and is due to the massive cerebrospinal fluid outflow and brain shrinkage [4]. However, in our experience with DMP, this has never led to postoperative complications.

Specific perioperative considerations

A plain radiograph of the cervical spine will help exclude large osteophytes. Although the risk of air embolism is low, a preoperative echocardiogram is advisable to exclude patent foramen ovale [1, 2]. Postoperatively, patients should be admitted to an intensive care unit overnight, and a computed tomography scan should be performed to exclude any surgical complications the following day.

Specific informations to give to the patient about surgery and potential risks

Patients should be informed regarding surgical risks, which may vary depending on the pathology, the exact location of the lesion, and individual patient characteristics. Patients should also be informed of any possible risk related to the position.

Ten key points

- Perfect understanding of the key concepts of the positioning
- The surgeon should be familiar with or experienced in the park bench position
- Thorough control of all the possible compression points (knees, hips, armpit)
- The head section of the operating table is elevated by about 30° until the thorax is clearly higher than feet
- The knees and hips are gently flexed and a pillow is placed between the knees
- A slight elevation of the legs is obtained by elevating the leg section or by putting pillows under the legs
- The head is kept in the same axis as the thorax, without lateral bending
- The head is rotated toward the side of the craniotomy and slightly flexed forward
- Some modification in rotation or forward flexion is allowed, depending on the exact location of the pathology
- Cervical spine stenosis and patent foramen ovale must be ruled out

Patient consent

Patients have consented to the submission of this How I Do It for submission to the journal, in accordance with COPE guidelines and with the CARE statement.

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

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Comments

Rotation of the head on the tumor side brings a more horizontal view of the long axis of the posterior petrous bone which you see as an advantage but could be debatable. The consequence of such a line of sight is the need to elevate significantly the level of the operative table specially if the surgeon needs to control what is in the depth around or even in front of the porus of the IAC ; to overcome this issue, there is a need to operate seated. Surgeons who do not seat during the surgery are limited by such constraint, which is a reason why they do not rotate the head and even more rotate the head toward the opposite side. So what you see as an advantage could be seen as not comfortable by others.

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