

## Original Article

# Evaluation of Postoperative Practices Regarding Packing of the External Auditory Canal

Laura Renard<sup>1</sup>, Charles Aussedat<sup>1,2</sup>, Marianne Schleich<sup>1</sup>, Thuy tran Trinh<sup>1</sup>,  
David Bakhos<sup>1,2,3</sup>

<sup>1</sup>CHU de Tours, Service ORL et Chirurgie Cervico-Faciale, Boulevard Tonnellé, Tours, France

<sup>2</sup>Faculté de Médecine de Tours, Université François-Rabelais de Tours, CHRU de Tours, Boulevard Tonnellé, Tours, France

<sup>3</sup>Inserm UMR 1253 I-Brain, Université François-Rabelais de Tours, CHRU de Tours, Boulevard Tonnellé, Tours, France

ORCID IDs of the authors: L.R. 0000-0001-8267-3249; C.A. 0000-0002-7253-164X; T.t.T. 0000-0002-3034-7908; D.B. 0000-0003-1417-5082.

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**BACKGROUND:** Packing of the external auditory canal after ear surgery is an established practice in most otologic centers. However, no guidelines exist concerning the management of this process. The aim of the study is to investigate otologists' habits concerning packing of the external ear canal after otologic surgery. A second objective was to collect their opinion concerning the absence of packing.

**METHODS:** This study is a cross-sectional survey. We sent an online questionnaire to the 135 members of the French Otology and Neurotology Association (AFON). It was conducted between March 15, 2020, and May 15, 2020. It consisted of 11 demographic questions and 6 surgical management-related questions concerning 6 major otologic procedures.

**RESULTS:** Fifty-seven members answered the survey. The most frequent packing used was ear wick with silicon sheets (48.6%) among all surgical procedures. Among participants, 62% used the same packing material for all surgical procedures. Of the participants, 96% were reluctant not to pack the external ear canal after otologic surgery.

**CONCLUSION:** This study shows a great variability concerning surgeons' practices. A randomized controlled trial would be helpful to guide surgeons for ear packing after otologic surgery and assess the absence of packing.

**KEYWORDS:** Ear surgery, middle ear surgery, otology

## INTRODUCTION

Packing of the external auditory canal (EAC) after middle ear surgery is an established practice in many ENT centers. Since the first packing technique, introduced in 1973, using Gelfoam,<sup>1</sup> various types of external ear packing materials have been described.<sup>2-4</sup> While packing materials vary among surgeons, the material of choice tends to be based more on tradition than evidence. The theoretical advantages of packing the EAC are to promote tympanic eardrum healing, to support a tympanic graft, and to reposition the tympanomeatal flap in the correct position to avoid EAC stenosis. Packing also aids local hemostasis, helps to avoid lateralization blunting, and improves local treatment<sup>4</sup> efficiencies.

Packing agents are classified as either non-absorbable or absorbable.<sup>3</sup> Non-absorbable packs include hydroxylated polyvinyl acetate (ear wick), silicone sheet, ribbon gauze (with antibiotics, antiseptic ointments, cream or bismuth, iodoform, paraffin paste). Non-absorbable packs need to be removed 7-21 days postoperatively, depending on the surgical procedure and the surgeon's habits. Removal is usually performed during a clinical visit without anesthesia, except for pediatric and/or anxious patients, in whom inhalation sedation (e.g., nitrous oxide/oxygen premix) can be used.<sup>5</sup> The disadvantages of non-absorbable packs are uncomfortable removal, bleeding, and graft or skin flap displacement following removal.<sup>4</sup> Absorbable packs such as porcine gelatin sponge (Gelita<sup>®</sup>) can have short-time resorption (8-14 days), and absorbable packs such as hemostatic collagen compress from veal dermis (Pangen<sup>®</sup>) can have long-time resorption (8 weeks). While there is neither pain nor discomfort, as seen with the removal of non-absorbable packs, hearing loss and ear fullness can persist for several weeks with absorbable packs.<sup>6</sup>

**Table 1.** Main Surgical Approaches Reported by Participants

	OPT (N = 55)	MPT (N = 55)	CPT (N = 49)	CTT (N = 54)	OTT (N = 36)	CWR (N = 40)
Transmeatal	56% (N = 31)	32% (N = 18)	13% (N = 7)	0% (N = 0)	0% (N = 0)	0% (N = 0)
Endaural	25% (N = 14)	31% (N = 17)	27% (N = 13)	2% (N = 1)	0% (N = 0)	0% (N = 0)
Enlarged endaural	0% (N = 0)	0% (N = 0)	0% (N = 0)	22% (N = 12)	28% (N = 10)	11% (N = 5)
Retroauricular	18% (N = 10)	36% (N = 20)	59% (N = 29)	76% (N = 41)	72% (N = 26)	89% (N = 35)

OPT, ossiculoplasty; MPT, myringoplasty; CPT, canaloplasty; CTT, closed technique tympanoplasty; OTT, open technique tympanoplasty; CWR, canal wall reconstruction.

Most previous otologic studies have focused on auditory performance or surgical complications involved with ear packing, but none have reported postoperative surgical habits among physicians. There is currently no consensus regarding ear packing and/or the preferred packing material. Therefore, there is a need to better understand postoperative practices among surgeons. The aim of this study is to describe practices among French otologists regarding the packing of the EAC after otologic surgery procedures. The secondary objective is to assess physicians' opinions on not packing the EAC.

**MATERIALS AND METHODS**

This study regarding ear packing habits among French otologists is cross-sectional and descriptive. It was conducted using an online anonymous questionnaire via Google Forms®, and participants were enrolled between March 15, 2020, and May 15, 2020.

Member physicians were recruited from the French Otology and Neurotology Association (AFON) mailing list, which currently includes 135 members.

Participants were asked to indicate their age, sex, experience in otologic surgery, and type of practice (public or private). Surgeons with less than 5 years of experience were excluded. The questionnaire included 6 major otologic procedures (myringoplasty, ossiculoplasty, canaloplasty, canal wall reconstruction (CWR), open and closed tympanoplasty). Participants were asked to describe their surgical approach for each procedure and their postoperative habits (post-operative management, type of packing, time of removal, follow-up process) via multiple-choice questions. Participants were also asked to express their opinion regarding the absence of packing. All the responses were anonymized and the ethics committee in human research of the CHU of Tours approved this project (No. 2020 055). Informed consent was obtained from every practitioner answering the survey.

The survey can be found at [https://docs.google.com/forms/d/15oFeGalLw43xUpz8CJ9nQI\\_OFQ7bc2IDKRpTrE4ih9Y/edit](https://docs.google.com/forms/d/15oFeGalLw43xUpz8CJ9nQI_OFQ7bc2IDKRpTrE4ih9Y/edit). Data were available on request from the authors.

**RESULTS**

**Participants**

Fifty-five otologists (11 women) responded to the survey invitation. The survey response rate was 41%; the mean age of the participants was 48.7 ± 12 years. Among participants, 67% (N = 37) had more than 15 years of otologic surgery experience and 33% (N = 18) had between 5 and 10 years of experience. Of them, 35% (N = 19) worked in a public hospital, 27% (N = 15) had a private practice, and 38% (N = 21) had a public/private practice. In terms of clinical

practice, 76% (N = 42) worked with pediatric and adult patients, with children accounting for 30% of their practice; 12 participants practiced surgeries only on adults. Table 1 summarizes the responders' characteristics.

**Packing Habits**

Figure 1 shows the different types of ear canal packing used for these procedures. The most frequent (48.6%) packing used was ear wick combined with silicon sheets, ranging from 33% for open technique tympanoplasty (OTT) to 70% for CWR. The second-most popular packing was ear wick for all procedures, ranging from 6% to 24%, except for OTT where paraffin gauze accounted for 27% of the participants' habits. The use of absorbable ear packing ranged from 6% (canaloplasty) to 22% (myringoplasty and closed technique tympanoplasty).

Figure 2 shows the different packing materials used for various surgical approaches. For 33% (endaural) to 60% (transmeatal and enlarged) approaches, the most frequently used ear packing was ear wick combined with silicone sheet (47%). The use of absorbable ear packing ranged from 7% (enlarged approach) to 26% (endaural approach). Among participants, 62% used the same packing material for all surgical procedures (ear wick plus silicone sheet). Among those who varied the packing material according to the procedure, 65% had more than 10 years of otologic experience.

Nearly all participants (96%) were reluctant to provide no packing. The reasons given included stenosis of the EAC (26%), misplacement of the tympanomeatal flap and blunting (7%), and delay of wound healing (7%). Two participants also commented on the risk of less efficiency of local treatments, one of external contamination, and the other of synechia.

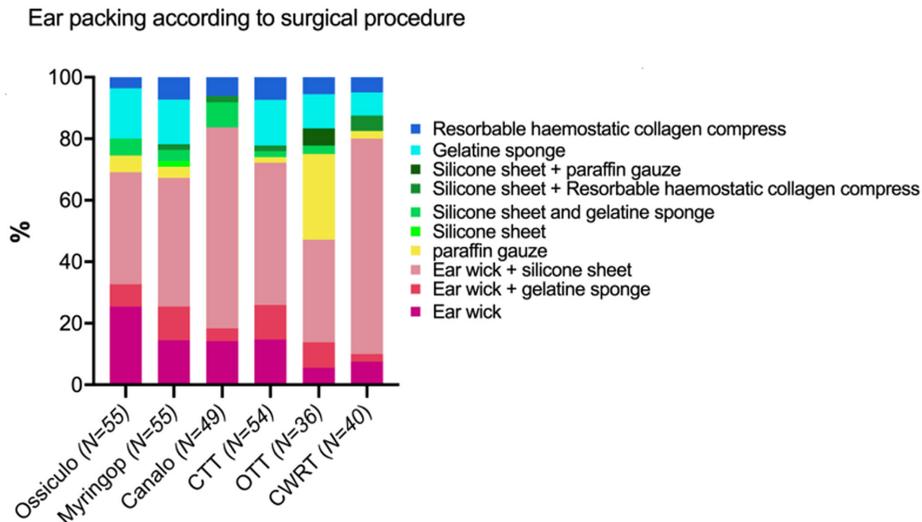
Finally, one participant reported an increased risk of iatrogenic cholesteatoma.

**Postoperative Habits**

Table 2 summarizes postoperative management habits. Among participants, 39% (open tympanoplasty) to 60% (ossiculoplasty and myringoplasty) prescribed local antibiotics, 78% (canaloplasty) to 95% (ossiculoplasty and CWR) prescribed oral analgesic, and 5% (myringoplasty) to 47% (open tympanoplasty) prescribed oral antibiotics. Among participants, 75% performed packing removal 7-10 days after surgery, 11% after 2 weeks, and 7% before 7 days.

**DISCUSSION**

The present data show the lack of standardization among ENT surgeons regarding ear packing among the procedures analyzed. The



**Figure 1.** Ear packing according to surgical procedure. This histogram illustrates the variability in habits among surgeons and shows that ear wick combined with silicone sheet is the most frequently used packing material. CTT, closed technique tympanoplasty; OTT, open technique tympanoplasty; CWRT, canal wall reconstruction.

most frequent packing was the combination of ear wick and silicone sheet, but many other materials were also used. We also found heterogeneous habits among pre-, peri-, and postoperative management. In this study, a large majority of the surgeons remove the packing within 10 days postoperatively. Nearly all participants were reluctant to perform ear surgery without any packing.

This heterogeneity may be explained by the lack of scientific evidence and thus the lack of recommendation. Only one guideline exists for pediatric populations, which recommends the use of a resorbable ear pack or a material that allows atraumatic removal.<sup>7</sup>

Zeitoun et al<sup>4</sup> compared 4 types of ear packing (paraffin gauze, Pope oto-wick, silicone sheet, and tricort ointment) and found no significant difference in terms of pain, discomfort, and postoperative complications (granulation, stenosis, and discharge).<sup>4</sup>

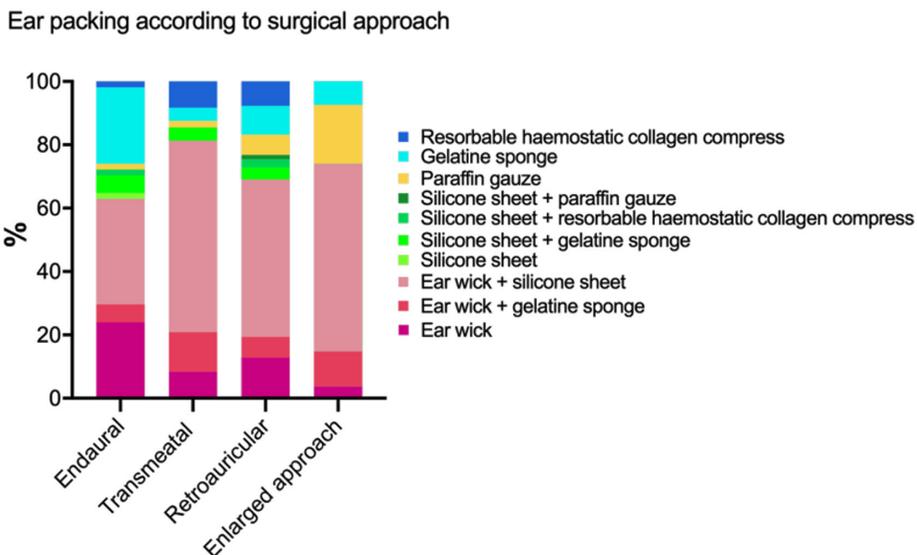
After taking that into account, the medico-economic aspect should be considered, as it differs significantly among ear packing agents.

For example, in our center, prices range from 0.10€ (paraffin gauze) to 17.7€ (silicone sheet).

A medico-economical study would be useful to determine the best ratio between price and efficiency for the different packing materials.

There are also no guidelines concerning the duration of packing; a recent study suggested that delaying the removal of the EAC packing after endoscopic cartilage myringoplasty may promote better healing of the tympanic membrane and cartilage graft epithelialization.<sup>8</sup>

While the postoperative practice of packing is widespread, it has some drawbacks such as uncomfortable hearing loss that can reach 40 dB, especially in patients who have a mild hearing loss before the surgery.<sup>6</sup> The removal of the packing can be a source of stress and pain for patients, which can explain why the combination of ear wick



**Figure 2.** Ear packing according to the surgical approach. As in Figure 1, the combined ear wick and silicone sheet is the most frequently used packing material.

**Table 2.** Local and General Postoperative Treatments According to Surgical Procedure

	OPT (N = 55)	MPT (N = 55)	CPT (N = 49)	CTT (N = 54)	OTT (N = 36)	CWR (N = 40)
<b>Local treatment</b>						
None	9% (N = 5)	7% (N = 4)	2% (N = 1)	6% (N = 4)	0	5% (N = 2)
ATB	60% (N = 33)	60% (N = 33)	47% (N = 23)	57% (N = 31)	39% (N = 14)	52% (N = 21)
ATB + CTS	29% (N = 16)	29% (N = 16)	49% (N = 24)	33% (N = 18)	39% (N = 14)	38% (N = 15)
ATB + ANG	2% (N = 1)	4% (N = 2)	2% (N = 1)	3% (N = 2)	5% (N = 2)	5% (N = 2)
<b>General treatment</b>						
ANG level 1	95% (N = 52)	91% (N = 50)	78% (N = 38)	83% (N = 45)	89% (N = 32)	95% (N = 38)
ANG level 1 + 2	22% (N = 12)	20% (N = 11)	27% (N = 13)	28% (N = 15)	31% (N = 11)	30% (N = 12)
NSAID	5% (N = 3)	7% (N = 4)	10% (N = 5)	10% (N = 5)	8% (N = 3)	7.5% (N = 3)
ATB	7% (N = 4)	5% (N = 3)	14% (N = 7)	22% (N = 13)	47% (N = 17)	45% (N = 18)
CTS	2% (N = 1)	0	2.5% (N = 1)			

OPT, ossiculoplasty; MPT, myringoplasty; CPT, canaloplasty; CTT, closed technique tympanoplasty; OTT, open technique tympanoplasty; CWR, canal wall reconstruction; ANG, analgesics; CTS, corticosteroids; ATB, antibiotics; NSAIDS, nonsteroid anti-inflammatory drugs.

and silastic is most frequently used. Indeed, silastic reduces adhesion to the EAC skin, thereby reducing pain during packing removal, which is ideal for children and/or anxious patients. There is also a lower risk of harming the tympanomeatal flap.<sup>9</sup>

Even if most of the practitioners interviewed were reluctant for the no packing technique, up to this date, there has not been any study that has shown a superiority of packing versus no packing in otologic surgery. We can draw a parallel with endonasal post-operative packing that was widely spread 10 years ago and is now used in fewer indications after studies showed no inferiority without packing.<sup>10</sup> In a previous study among a pediatric population, Borgstein et al<sup>11</sup> showed a low rate (7.5%) of infection without packing after major ear surgery,<sup>11</sup> as well as better patient satisfaction and cost effectiveness (due to reduced follow-up visits). A similar result was obtained by Hirvonen<sup>12</sup> who showed no major complications in 21 patients who had transcanal otologic surgery without packing (only 1 had an ear infection, treated successfully with antibiotics). As such, “no packing” could be used for surgical procedures where the dissection of the tympanomeatal flap is minimal (e.g., transmeatal approach).

However, in his study, Wang et al<sup>13</sup> pointed out that “no packing” is not suitable for patients with incomplete tympanic mucosa, too narrow EAC, or patients with too few perforation margins.<sup>13</sup>

Some study limitations should be discussed. As in most survey studies, there is inherent bias such as the non-response bias. We tried to reduce it by sending iterative e-mails to increase the rate of response. The number of responses may seem limited (N = 55), representing 41% of the AFON members, but it is consistent with the data of the literature on the subject. For example, Ekman et al<sup>14</sup> described an answer rate of 40% of the people interviewed.<sup>14</sup>

Nevertheless, with this limited number of participants, the large variability of ear packing management was still demonstrated.

Another bias is the sampling bias: in this study, we chose to focus only on experts, a status that we defined as more than 5 years of

experience in otologic surgery. In addition, by choosing the online survey, we excluded people who were not familiar with the frequent use of the internet.

**CONCLUSION**

This study shows that current practices for the packing of the EAC are not based on evidence-based medicine and emphasizes the need for recommendations on the subject. In future studies, a randomized controlled trial with a large number of patients should be conducted to produce guidelines regarding the type of packing, as well as general and local treatments according to surgical procedure. Other studies should evaluate the use of no packing for surgeries with a small dissection of the tympanomeatal flap.

**Ethics Committee Approval:** The ethics committee in human research of the CHU of Tours approved this project (No. 2020 055).

**Informed Consent:** Informed consent was obtained from every practitioner answering the survey.

**Peer-review:** Externally peer-reviewed.

**Author Contributions:** Concept – D.B., C.A., R.L.; Design – D.B., R.L.; Supervision - D.B., C.A.; Resources – D.B.; Data Collection and/or Processing – T.t.T., M.S.; Analysis and/or Interpretation – T.t.T., R.L.; Literature Search – D.B., C.A., R.L.; Writing Manuscript – D.B., C.A., R.L.; Critical Review – D.B., C.A., T.t.T.

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