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## A Child Presenting with a Bullet in the Middle Ear: Case Report

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### Abstract

**Introduction:** Foreign bodies in the external auditory canal are common in both adults and children. Removal of the foreign body requires skill, but is usually successfully performed in the emergency department. We report a case of a child with a bullet in ear canal which was pushed into the middle ear during an attempt to remove it.

**Case Presentation:** A 6-year-old Thai boy went to the community hospital with his parents, who reported that their child had pushed a bullet into his ear. Ooscopic examination revealed a metallic foreign body in his external auditory canal. The first attempt to remove the foreign body failed and the child was referred to an otolaryngologist. We found that the tympanic membrane was ruptured, with granulation tissue in the middle ear and the bullet was located in the hypotympanum. The foreign body was removed via a post-auricular approach.

**Conclusion:** Removal of a foreign body from external auditory canal is an essential skill for physicians. Careful removal can prevent further trauma and complications. When the first attempt fails, referral to an otolaryngologist is recommended.

**Keywords:** foreign body, middle ear, auditory canal

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## Introduction

Foreign bodies in the external auditory canal are a common condition in both adults and children. They are most often encountered in children aged between 2 and 8 years.<sup>1</sup> Beads, cotton tips, insects and paper are the most commonly identified foreign bodies.<sup>2,3</sup> The true incidence is difficult to evaluate. Some authors reported an association between the foreign bodies in external auditory canal and middle ear pathology eg, middle ear effusion, Eustachian tube dysfunction.<sup>4-6</sup>

The most common complications of a foreign body in the ear are bleeding, fetidness and otitis externa.<sup>7</sup> Removal of a foreign body requires skill but is usually performed successfully in the emergency department.<sup>8,9</sup> Inexperienced physicians tend to have a higher incidence of iatrogenic complications, including auditory canal laceration, bleeding, infection and perforation of the tympanic membrane.<sup>10-12</sup>

We report a case of a child with a bullet in the ear canal which was pushed into the middle ear during an attempt to remove it.

## Case Presentation

A 6-year-old Thai boy went to the community hospital with his parents, who reported that their child had pushed a bullet into his ear. Otoscopic examination revealed a metallic foreign body in his external auditory canal. The physician tried to remove the foreign body in the OPD, but failed due to poor co-operation by the child. The child then underwent attempted foreign body removal under general anaesthesia. The physician reported that he could not remove the foreign body and prescribed intravenous antibiotics for one week. Subsequently,



**Figure 1.** Mastoid radiographs: the metallic foreign body can be seen in the right middle ear.

the child was referred to our university hospital for definitive treatment.

On arrival, his vital signs were stable. On otoscopic examination, we found that his external auditory canal was lacerated, swollen and occluded by granulation tissue. We could not identify the foreign body. A subsequent x-ray of the mastoid region showed a metallic foreign body in the right middle ear (Fig. 1).

The child underwent foreign body removal under general anaesthesia. We carefully removed the granulation tissue for adequate visualisation by micro-otoscopy and found that the tympanic membrane was ruptured, there was granulation tissue in the middle ear and a bullet located in the hypotympanum. We tried to remove the foreign body by a trans-meatal approach but the external auditory canal was severely narrowed by the inflammation process, so we changed to a post-auricular approach. Using this technique the bullet was successfully removed from the hypotympanum. The patient was discharged the next day without any complications.

We prescribed oral amoxicillin for one month. At two weeks after removal, the post-auricular wound was healed and the granulation tissue had decreased. The tympanic membrane was fully healed at the one month follow-up visit.

## Discussion

A foreign body in the external auditory canal is a common condition in children, but few case reports of foreign bodies in the middle ear in this age group have been published. Kohan et al<sup>13</sup> reported six patients who had impaction of ear mould impression material in the middle ear that required surgical intervention and two of them were children. Jacob et al<sup>14</sup> reported a child who had ear mould impression material in the middle ear, which had entered via a ventilation tube during fitting for swim moulds. Shashinder et al<sup>15</sup> also reported a child that impression material accidentally entered the middle ear.

Animate foreign body in the middle ear is rare. Supiyaphun et al<sup>16</sup> reported the mature termite in the middle ear; it was difficult to identify this living creature, even using an operating microscope.

Clinical presentations of foreign bodies in the middle ear include otalgia, fullness, hearing loss, tinnitus and intermittent otorrhoea in chronic cases. Physical examination usually reveals inflammation



of the external auditory canal, debris, granulation tissue and perforation of the tympanic membrane.<sup>17,18</sup> In some cases, a foreign body may be seen through the perforated tympanic membrane.<sup>18</sup> Imaging studies are helpful in evaluating the nature and location of a foreign body in the middle ear.<sup>13,14,17,18</sup>

Removal of a foreign body in the external auditory canal requires expertise. Many authors found that non-ENT personnel significantly associated with complications and emphasize that difficult or all cases should be managed by an otolaryngologist.<sup>12,19,20</sup>

Success depends on the type of foreign bodies, the co-operation of the patient, the type of instrument used and the experience and skills of the physician.<sup>12,21</sup> Iseh et al<sup>22</sup> reported 207 cases of foreign bodies in the ear, only one of them requiring a major surgical operation (posterior tympanotomy). Endican et al<sup>23</sup> reported 711 cases of foreign body in the external auditory canal in children. In one of these cases (0.1%), a seed was pushed into the middle ear through pre-existing perforation of the eardrum during attempted removal in the clinic.

Singh et al<sup>19</sup> reported the high complication rate for foreign body removal without general anesthesia. Removal in the operating room under general anesthesia is recommended in uncooperative patients. An unsuccessful attempt to remove a foreign body may cause further trauma and complications, eg, foreign body in the middle ear. In our case, lack of co-operation by the young patient was a significant factor in the failure to remove the foreign body.

After failure of the first attempt at removal, the external auditory canal usually becomes swollen and infected, making otoscopic examination afterwards difficult. Importance of removing the foreign body in the first attempt (rather than repeated attempts) should be emphasised.<sup>24</sup> Mastoid radiographs are of value when trying to locate an opaque foreign body and are useful when planning treatment. Intravenous antibiotics as sole treatment are not appropriate. We suggest that a combination of antibiotics and corticosteroid ear drops would have decreased the swelling of the external auditory canal during the period prior to the second attempt at removal.

## Conclusion

Removal of the foreign bodies from external auditory canals are an essential skill for physicians.

Careful removal can prevent further trauma and complications. When the first attempt fails, referral to an otolaryngologist is recommended.

## Consent

Approval was sought from the Khon Kaen University Ethics Committee for Human Research before initiating the study and informed consent was obtained from the patient and his parent for publication of this case report and accompanying images.

## Competing Interests

The authors declare that they have no competing interests.

## Authors' Contributions

PP performed the operation, analyzed, interpreted the patient data and was a major contributor in writing the manuscript. SS, PL and RM wrote the discussion section and revised the manuscript. All authors read and approved the final manuscript.

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