



User Guide for the SAMEO-ATO categorisation of Tympanomastoid Surgery

International Otolgy Outcome Group

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Explanatory notes on the IOOG categorization of tympanomastoid surgery

- The aim of the SAMEO-ATO categorization is to aid comparison of surgical outcome from middle ear and mastoid surgery between institutions.
- SAMEO-ATO is an acronym that outlines the subgroups of mastoid and middle ear surgery that comprise the classification system.

Stage of operation

Approach

Mastoidectomy procedure

External auditory canal reconstruction

Obliteration of mastoid cavity

Access

Tympanic membrane (TM) repair

Ossicular chain repair

} Mastoid Surgery

} Middle ear surgery

- Where possible terminology in the SAMEO-ATO system is derived from descriptors used in ICD-10-PCS (see <http://www.icd10data.com/ICD10PCS/Codes/0/9>). To minimize ambiguity, terms describe what the surgeon does rather than historical nomenclature that may be open to variable interpretation. For this reason, procedures are not grouped by terms such as atticotomy (see also below), modified radical mastoidectomy, radical mastoidectomy, tympanoplasty. Nevertheless, common names such as these are included in brackets to facilitate understanding.
- The IOOG steering committee recognises that there is great variation in surgical techniques used by surgeons all over the world. The committee has aimed for a balance in the SAMEOATO system between simplicity and over-complexity in order to provide a usable classification that includes the parameters that distinguish important differences in surgical intervention. Surgeons that perform a procedure which they consider differs significantly from any of the categories defined by SAMEO-ATO are encouraged to allocate their procedures to the closest fit. Details of any such differences should be recorded separately to generate data that can be used to stimulate future revisions of the SAMEO-ATO system.

- Other important parameters that might influence outcome including patient-related variables, complications of disease or surgery, and further surgical details such as the nature of previous surgery, grafting materials, concomitant use of ventilation tube and active middle ear implants are beyond the scope of this surgical classification. The IOOG steering committee is developing a common data set for middle ear surgery to use alongside the SAMEO-ATO system that will include such topics. Of course additional parameters may be recorded by individual surgeons but this should not compromise allocation of procedures into the SAMEO-ATO categories.
- The SAMEO-ATO system has been developed for implementation in prospective data collection. Although it may be possible to apply the system retrospectively, the accuracy of classification will be impaired significantly by the limits of previously collected data fields. Users should report whether the system has been applied prospectively or retrospectively and emphasise potential discrepancies from retrospective use.
- The IOOG steering committee does not advocate any particular surgical procedure or combination of procedures that may be defined by the SAMEO-ATO classification but has simply attempted to derive a comprehensive classification system. An example raised during consensus discussions was that ossiculoplasty type O_{vt} might be dangerous so arguably should not be performed, but it remains in the classification for completeness.

Guidance on implementation of SAMEO-ATO categorization in tympanomastoid surgery

These notes provide guidance on use of the SAMEO-ATO system. IOOG advises that surgeries be categorized using all components of the SAMEO-ATO, not limited just to the parts of surgery that are completed (eg absence of any mastoid surgery is categorized as $M_xE_xO_x$). 'Stage of surgery' and 'Approach' are applicable to both middle ear and mastoid operations.

- Stage of operation
 - i. S_1 signifies the first surgery for the condition being treated
 - eg first operation for cholesteatoma after a previous TM perforation repair
 - ii. S_2 signifies any subsequent surgery for that condition, not the number of operations completed
 - eg third surgery for a recurrence of cholesteatoma after two planned stages of surgery is coded as S_{2r}

- Approach
 - i. If an incision is used for access to the mastoid, use of an endoscopic surgery is considered as an adjunct procedure
 - eg post auricular incision used for endoscopic access to the mastoid is A₄ even if no microscope is used
 - ii. If an external incision is made for harvest of a graft but not used for access to mastoid or middle ear, this is classified as A₁ or A₂.
 - iii. The term “permeatal approach” is considered to be synonymous with transcanal approach

Mastoid Surgery

- Mastoidectomy procedure
 - i. M1 procedure is a mastoidectomy leaving the canal wall intact (preserved), M2 is a mastoidectomy with removal of the canal wall partly or completely
 - ii. M2a: as part of the canal wall is removed with removal of the scutum (atticotomy), this procedure is categorised in SAMEO-ATO with other “canal wall down” surgeries. However, many surgeons incorporate an atticotomy and scutum reconstruction with a cortical mastoidectomy in what is considered “canal wall up” surgery. This hybrid procedure is defined in SAMEO-ATO by combining the Mastoid codes for cortical mastoidectomy and scutum removal (eg M_{1a,2a} or M_{1b,2a} if posterior tympanostomy included).
 - iii. Partial scutum removal in which the inferior margin of the scutum is preserved, so creating a window in the bony wall of the ear canal for access to epitympanum or mastoid is also to be classified as M_{2a}.
 - iv. M_{3a} differs from M_{2c} in that the cavity is closed off completely with ear canal closure (removal of all ear canal skin and TM) as well as blocking up of the tympanic opening of the Eustachian tube.
- External auditory canal reconstruction
 - i. Different materials may be used to reconstruct the scutum and/or bony canal wall with the intention of leaving a ventilated attic and mastoid under the graft.
 - E₁ Soft tissues include fascia, perichondrium, pericranium, periosteum and some bio-engineered grafts (eg porcine collagen or cadaveric human skin derivatives)
 - E₂ Hard reconstruction includes cartilage, bone, or solid prosthetic materials (eg titanium, hydroxyapatite).
 - ii. If an obliteration is added to the procedure the reconstruction of the ear canal prior obliteration can be noted under E.

- iii. Type of material can be added to with small letters in own database and should be reported when presenting a series.
- Obliteration of mastoid cavity
 - i. O_x means an empty air space is present behind the ear canal or in the cavity.
 - ii. Partial obliteration spares the attic cavity \pm part of mastoid cavity (ie just a reduction of the size of cavity). Total obliteration is complete obliteration of the whole mastoid AND attic cavity.
 - iii. *Obliteration of the attic without obliteration of the mastoid is considered O_1*
 - iv. Type of obliteration material can be added to with small letters in own database and should be reported when presenting a series.

Middle Ear Surgery

- Access
 - i. The distinction between A_2 and A_3 is that in A_3 there is an absence of meatal skin to line the ear canal, eg during surgery for medial canal fibrosis.
 - ii. This Access category has not been developed for congenital meatal atresia surgery.
- Tympanic membrane (TM) repair
 - i. T_n TM Normal, No Need for surgery
 - ii. T_x TM not normal but not repaired
 - eg: atelectatic TM elevated but not reconstructed; perforation present but surgeon chose not to repair; or, previous cartilage tympanoplasty
 - iii. T_3 Total perforation is defined as complete absence or removal of the TM and annulus. Subtotal perforation is the absence of TM but the annulus is still preserved.
- Ossicular chain repair
 - O_n Normal ossicular chain. Ossicular repair Not Needed
 - O_x Ossicles not normal, but no ossiculoplasty performed
 - i. It should be noted that the ossiculoplasty diagrams are conceptual and not a surgical illustration of technique. The stapes superstructure is shown in faded outline (O_{fm} and O_{ft}) to indicate that a reconstruction can be performed whether superstructure is absent or present.
 - ii. Categories of ossiculoplasty are defined by the furthest points of contact of the graft or prosthesis between these anatomical structures:

- m malleus handle
- t tympanic membrane (TM)
- i incus
- s superstructure of stapes
- f footplate of stapes
- v vestibule (no distinction is made between footplate perforation, footplate removal or placement of a soft tissue graft, though these differences may be recorded for presenting/reporting on the dataset)
- d direct coupling of TM without a graft or prosthesis (eg O_{sd} is myringostapediopexy)

iii. Regarding cartilage tympanoplasty with absent incus but intact stapes:

- O_{sd} Flat cartilage graft used in TM reconstruction in contact with stapes (cartilage myringostapediopexy)
- O_{st} Shaped piece of cartilage placed as a bridge between stapes and TM

iv. Placement of a silastic band around the stapes superstructure and the shaft of a total ossicular replacement prosthesis between footplate and TM is included within O_{ft} and O_{fm}