Tubomanometry in Children With Normal Eustachian Tube Function: Normative Data

Nicolas Gürtler1, Götz Kuhlmann1, Sabine Schädelin1

CONCLUSIONS:
The 90th percentile of the combined R-values in children was at 1.13. In general children had rather a delayed opening (R-value > 1) than no opening (R-value = 0). No strong association with age could be found. We see an additive role for Tubomanometry in the assessment of Eustachian Tube Function, as it is feasible and reproducible and as no single test with high sensitivity and specificity exists. We suggest to perform 6 measurements for each side and propose an R-value of 1.1 as normal value for children, which in the future has to be tested in a sensitivity analysis in pathologic cases.

INTRODUCTION / OBJECTIVES:
Chronic dysfunction of the Eustachian tube is a frequent disease in children often requiring multiple interventions. Diagnostics is mainly limited to tympanometry and otomicroscopy. Tubomanometry could improve diagnostic power, but has not yet been well validated (1).

Tubomanometry: a pressure change in the external auditory canal is measured, when pressure is increased in the nasopharynx during a swallowing maneuver, leading to an opening of the Eustachian Tube (Fig.1). In this study feasibility was tested and normative values of tubomanometry in children with normal Eustachian tube function established.

DESIGN:
Power analysis; exclusion of Dysfunction of the Eustachian tube by questionnaire, otomicroscopy and tympanometry. Tubomanometry: 2 measurements at pressure level 30mBar, 40mBar and 50mBar for each side. Parameters: R-value and age. The R-value describes the time elapsed between the application of the increased pressure in the nasopharynx and the pressure changes in the external ear canal (Fig. 2). R-value ≤ 1: accurate opening of the tube; R-value > 1: late, “pathologic” opening. Study approval by Ethics Committee of the University Hospital, Basel, Switzerland.

RESULTS:
Demographics: Table 1. Table 2 lists the 90th percentiles for the R-value (total, each side, each pressure level). The percentile was always slightly >1 suggesting that the opening in children may be slower compared to adults. No age dependency was found. Table 3: numbers of normal and pathological openings. Most patients with pathological opening had a delayed opening rather than no opening. All children tolerated the procedure well.

Table 2: R-value: 90th percentile for each side + for each pressure level

Table 3: R-value: number of “normal” and “pathologic” measurements according to side and pressure

![Pressure Curve Ear Canal](image1.png)

![Pressure Curve Nasopharynx](image2.png)

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