

## Main Topic

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# Bilateral eustachian tube dilatation in infants

An alternative treatment for persistent middle ear functional dysfunction

## Background

Eustachian tube dilatation has become established in the last 2 years for managing chronic ventilatory dysfunction of the eustachian tube in adults. In children the procedure has been used only at the ENT clinic of the Bundeswehrkrankenhaus Ulm as per the knowledge of the authors.

Till now 105 children with chronic eustachian tube dysfunction have been treated at the Bundeswehrkrankenhaus Ulm during the last 18 months who did not respond to conventional treatment. A systematic evaluation of the treatment results has not taken place till date due to the short follow-up period in the total collective. A first evaluation has shown, however, that with the balloon tuboplasty obviously a new method was established, which could be described as a milestone in the treatment of chronic eustachian tube dysfunction in childhood. The authors would like to present an example for the efficiency of the procedure with the available case history.

## Case Description

The girl born on 01 August 2009 presented to the ENT physician regularly from her 12<sup>th</sup> month of life due to infections of the upper airways.

From November 2010 the situation aggravated, as the patient visited the ENT physician partly every 2 weeks due to repeated middle ear infections requiring antibiotic treatment.

In spite of intensive antibiotic treatment the child had repeated infections. As the present pharyngeal tonsil hyperplasia was regarded as cause, adenotomy and bilateral tympanic draining was performed on 26 April 2011.

In spite of these measures middle ear infections recurred every 2-3 weeks. Overall 7 more antibiotic treatments were carried out from May to November 2011 due to this fact.

As the course of treatment did not yield any success, the infant presented to the ENT clinic of the Bundeswehrkrankenhaus Ulm on 17 November 2011 with the question, whether balloon dilatation was possible.

After a detailed discussion of all treatment alternatives and comprehensive information, the authors suggested to the parents an epipharynx and ear inspection under general anaesthesia with the option of tube dilatation.

During surgery the tubal ostia presented completely obstructed by adenoid tissue, thus tube dilatation was technically not possible. Another adenotomy was done and subsequently a topic cortisone treatment followed for 2 months.

On 17 January 2012 the patient returned. In the meantime, 2 infections of the middle ear had again occurred, which had been treated with antibiotics.

The tubal ostia could be described during the subsequent examination under general anaesthesia. Bilateral tube dilatation was done with 10 bar for 2 min. No abnormalities occurred during and after the intervention.

Since the performance of balloon tuboplasty on 17 January 2012 till today middle ear infection has occurred only once, which had to be treated with antibiotics.

## Discussion

Treatment resistant ventilation dysfunction of the middle ear in children is the most frequent cause for the subsequent occurrence of chronic middle ear disorders. Causal treatment appears problematic in many cases. Only if the causes, like for e.g. a pharyngeal tonsil hyperplasia or an allergic rhinitis, are clearly determined, it is possible to achieve symptom relief.

In the other cases, the children affected often suffer for a long time being subjected to repeated paracenteses and grommet inserts (Overview for [1]).

The interest in an effective treatment option is correspondingly high.

In the meantime, convincing results for the treatment of adults using the Bielefeld balloon system have been made available by various study groups. [2, 3].

In case of children this method has not been used so far. This is even more surprising, as the treatment of such eustachian tube dysfunction in childhood is of particular relevance for the prevention of chronic middle ear infections. Also there is no recommendation of the manufacturer that the procedure can be used only in adults.

The case described here records the first worldwide instance of use of the balloon tuboplasty in an infant. All available and established treatment measures had been exhausted. Nevertheless repeated middle ear infections occurred, which had to be treated with antibiotics. After detailed and repeated information of the parents, the authors decided to use tube dilatation in this case - as per the explicit wish of the parents.

During the first intervention, however, extended adenoid vegetation was seen again, thus the fossa of Rosenmuller was not visible. Therefore it was decided to carry out one more adenotomy and a local treatment with a steroid subsequently for 2 months.

The description of the fossa of Rosenmuller in infants is also very difficult with normal anatomy without hyperplastic adenoids. Also the usually available optics are too large in diameter for the nose of a child. As per the experiences of the authors till date, a short optic with a diameter of 2.5- 3mm was used.

During the second therapeutic intervention balloon tuboplasty could be done bilaterally in the typical manner.

Modification of the commercially available catheter is not necessary as per the experiences of the authors.

With balloon tuboplasty, a convincing treatment result had been achieved for the patient. During the follow-up period of 14 months middle ear infection requiring antibiotic treatment occurred only once. Another paracentesis or tympanic draining was not necessary.

### **Significance for the practice**

- As per the opinion of the authors eustachian tube dilatation is a confirmed and reliable treatment alternative for conservative treatment resistant chronic eustachian tube dysfunction.
- Tube dilatation can be used in adults and also in children.
- In children, the risk of chronic middle ear infection in young or adult age may be reduced by successfully treating chronic eustachian tube dysfunction.
- Tests on larger collectives and multicentric studies are urgently required in order to consolidate the posed hypothesis.

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**Interest conflict:** The corresponding author discloses the following relationship for himself and his co-authors: M. Tisch declares that he had advised the Spiggle & Theis company regarding the further development of the balloon dilatation procedure.

### **Literature**

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### **Abstract**

Balloon dilation has become established as a novel method for managing chronic ventilatory dysfunction of the Eustachian tube. This treatment has so far not been used in children. This article presents the first case of a pediatric patient who required antibiotics for recurrent middle ear infections and was successfully treated with Eustachian tube dilation. After a single dilation the patient was almost free of symptoms. Further studies are required in order to establish this treatment in the management of children with recurrent ventilatory dysfunction of the Eustachian tube which does not respond to conventional therapy and to define existing and potential new indications for this treatment approach.

**Keywords**

Balloon dilation • Ventilation disorder of the middle ear Adenoids • Eustachian tube Child, preschool