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# Tinnitus in Children - Still a Neglected Problem

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**Abstract:** In general, pediatric tinnitus and head trauma, induce tinnitus in children, in particular, which are a neglected problem in Ear, Nose, and Throat and pediatric medicine. A case report and the pertinent literature demonstrating this issue are presented. It is recommended to perform controlled studies regarding pediatric tinnitus in order to identify, and treat it, so as to minimize its damage.

Subjective tinnitus which is often reported as being very disturbing is rarely mentioned in the pediatric population.<sup>1</sup> Nodar<sup>2</sup> mentioned in his literature review of 11 years, that he found only two publications dealing with tinnitus in children. This fact is even more amazing as tinnitus is not uncommon in the pediatric population; 13%<sup>3</sup> to 29%<sup>4</sup> of normal hearing children and 59% of children who had their hearing screened at school<sup>3</sup> complained of tinnitus. Tinnitus was reported in 66% of children with moderate to severe deafness and in 29% of deaf children.<sup>5</sup> Out of those with moderate to severe deafness, 30% complained of a very disturbing tinnitus (every day in frequency, of at least 30 minutes duration and grade III out of three severity degrees of loudness). Although tinnitus in children is as common as in the adult population, children generally do not complain spontaneously of having tinnitus.<sup>5</sup> Out of 403 children with tinnitus only 3% complained spontaneously.<sup>4</sup> This discrepancy between the high incidence of tinnitus and low rate of spontaneous complaint in children may be explained by the fact that the child considers tinnitus to be a normal event, as it has usually been present for a long period of time.<sup>6</sup> A second explanation of this discrepancy lies in the fact that the child may not distinguish between the psychological impact of the tinnitus and its medical significance.<sup>6</sup>

Even if a child does not mention the existence of tinnitus, nevertheless, it may cause difficulties in concentration and bring about behavioral problems.<sup>5</sup> Pediatric tinnitus, despite its incidence and behavioral sequela, has not received adequate consideration in the otolaryngological and pediatric literature; furthermore, there is complete disregard concerning the post traumatic tinnitus in children. There is no reason why such an important etiologic factor reported in the adult population<sup>7,8</sup> would not be present in the pediatric population, in which head trauma is, at least, as frequent as in the adult one.

## CASE REPORT

The following case report may illustrate the above mentioned facts.

M.E., a four-year-old boy was referred to our outpatient clinic for audiological evaluation. This child was a victim of a road accident ten months earlier. Brain computer tomography (CT) showed a transverse linear fracture of the right temporal squama without intracranial pathology. His previous audiological examination showed a mild right ear hearing loss. When asked about

any complaints concerning pain or noise in his ears or head, he did not answer. His parents denied there were any complaints of the child, and they only observed two main facts in the boy's behavior since the accident. First, they noted some deterioration in the lingual capacity of the child, and secondly, the boy was generally irritated and nervous when he lay in his bed at night and only after his father turned on the radio did he relax and fall asleep. Later, the boy was asked again "what do you feel when you go to sleep at night in a quiet room?" After some hesitation he answered "noise!" "Where do you hear this noise?" He pointed at this right ear. After that no more cooperation could be achieved.

It is important to mention that this child underwent a behavioral study in a "Child Development Center." The

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most prominent findings were the following:

- (1) The cooperation of the child was only partial.
- (2) His concentration capacity deteriorated quickly after ten minutes.
- (3) He had a lingual retardation of about six months.

No one asked him about - **Ear Noises!**

ENT examination was normal. His audiogram showed a mild right high tone sensory neural hearing loss with good discrimination of 92%. No other audiologic investigation could be done as the boy did not cooperate.

## DISCUSSION

The case of M.E. illustrated the need for serious consideration of pediatric tinnitus in general, and pediatric head trauma induced tinnitus, in particular.

Post head trauma tinnitus in the adult population is well known entity. Subjective tinnitus was reported to be most frequent in patients following head injury.<sup>7</sup> Proctor<sup>9</sup> reported approximately 25% tinnitus incidence in patients with longitudinal temporal bone fractures. In general, the post head injury was reported in three - 35% of cases depending upon the severity of head trauma.<sup>7</sup>

In a recent study<sup>8</sup> 8% of all tinnitus patients were of post head injury. The tinnitus after head trauma may or may not be associated with temporal bone fracture. The tinnitus is generally of the severe, disabling type and there is not correlation between severity of the tinnitus and severity of the associated sensory neural loss.<sup>10</sup>

Vernon and Press<sup>8</sup> in 1994 found that "tinnitus induced by head injury was significantly ( $p = 0.04$ ) louder than tinnitus induced from other causes but, interestingly, did not require higher levels of marking." The authors found also that the tinnitus induced by head trauma could, more frequently ( $p = 0.003$ ), display residual inhibition.<sup>8</sup>

Tinnitus was almost completely ignored in the pediatric population. In one of the few reports regarding pediatric tinnitus,<sup>11</sup> the authors reported that the most common cause of subjective tinnitus in children is a drug side effect - especially with aspirin. "When this type of tinnitus develops in an otherwise asymptomatic child, who is not taking drugs, it is usually caused by a central nervous system lesion, e.g., a tumor, demyelinating disease or hereditary neuropathic disease..."<sup>11</sup> with no mention of trauma.

Are children less subjected to head trauma? Children stumble and fall frequently during their daily activity, much more than the adult population. Children more than adults are knocked down by motor vehicles. The child with head trauma, generally does not undergo a routine ENT examination in the emergency room. When the

otolaryngologist is called to investigate the wounded nose, face or even ear of a child with head injury, it is really doubtful if the child is asked about tinnitus in the emergency room, pediatric department, or even later.

This reasonable lack of tinnitus anamnesis, in addition to the child's tendency not to complain spontaneously of tinnitus, may explain the complete absence of consideration of the pediatric post traumatic tinnitus. The complete ignorance of this subject may lead to serious consequences in the child's development. As already mentioned, even if the child does not complain of tinnitus, the tinnitus may lead to concentration and behavioral problems.<sup>5</sup>

As the head injury induced tinnitus is louder than that of other causes,<sup>8</sup> its damage to the child's development by learning difficulties and behavioral problems may be more severe than for other tinnitus etiologies and may remain irreversible. The damage to the learning capacity of a small child may lead to more permanent deficiencies than that in the adult, although the adult reacts generally with more anxiety and sleep difficulties than the child.<sup>12</sup> The tinnitus may cause behavioral problems in a child even though it may disappear later.

Tinnitus may act as a serious aggravating factor to post concussion syndrome, as this probably happened in our reported case. Being treatable by masking (generally with residual inhibition)<sup>6</sup> the post traumatic tinnitus could be alleviated and the consequences avoided. Therefore, it is of great importance to try to identify those children and to attempt to treat them accordingly.

## CONCLUSION

In general, pediatric tinnitus and head trauma induced tinnitus in children in particular, must be considered much more seriously in otorhinolaryngology and pediatric medicine. Therefore, controlled studies must be performed on this problem, in order to identify, treat and minimize its damage.

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