Abnormality of dolls’ eyes response to head tilt in roll in patients with Meniere’s disease
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Background
The most notable histopathological feature of Meniere’s disease (MD) is, by definition, the endolympathic hydrops (EH). Despite initially the EH involves the whole inner ear system, there are few reports of stedihy dysfuncytion due to the EH in MD patients [1, 2].

Objectives
To detect the EH to the stedihy organs, we investigated the stedihy nature based on the dolls’ eyes response to head tilt in roll (dolls’ eye) in MD patients.

Methods
Dolls’ eye was investigated in eight normal subjects, ranging in age from 22 to 67 year-old and age-matched eight out of 18 MD patients in age from 17 to 67 year-old (age matched eight normal subjects and eight patients mean ages are 52.4 and 46.3, respectively), visiting our clinic from April in 2002 to the present time.

Fig. 1. The dolls’ eyes manoeuvre in head tilt (dM) was applied in all subjects and patients (Fig. 5).

Fig. 2. Dolls’ eyes response to head tilt (Dolls’ eye) as to normal subjects (n=8).

Fig. 3. Dolls’ eye as to MD patients (Nu.1 - Nu.4).

Fig. 4. Dolls’ eye as to MD patients (Nu.5 - Nu.8).

Fig. 5. Dolls’ eye as to hearing level improved MD patients (similar to normal subjects).

Fig. 6. Hearing level improved MD patients

Discussion and Conclusion
We could not realize which the vestibular organs actually play a main role of these strange eye movements in MD patients. It is reported that some of MD patients showed abnormal stedihy tion (AOT) in the upright position that can be contributed stedihy dysfunction because of the EH [1]. And also some report argue nowadays stedihy tilt reaction (OTR) in patients with peripheral vestibular disorder, MD [5], as well. AOT and/or OTR may drive an incoherent response to dM and produce strange eye movements. According to this, in cases of MD, dM can be useful to detect strange eye movements non-invasively. Therefore, we emphasised that dM could detect the EH in MD patients.