Benign Paroxysmal positional vertigo (BPPV) which is defined as a disorder of the inner ear characterized by repeated episodes of positional vertigo is thought to relate endolymph debris (maybe fragmented otoconia detached from utricle) in semicircular canals. BPPV is classified as lateral (horizontal) or anterior canal although it occurs more frequently in posterior canal. Since debris in the lateral canal is associated with the cupulolithiasis of BPPV, an Exercise Therapy for the Cupulolithiasis of BPPV was performed in 14 cases with intractable horizontal canal BPPV confirmed by the criteria as follows:

### Methods and Materials

The subjects were 14 patients (8 males and 6 females; age range, 30-73 years; mean, 65.5 years) who had episodes of positional vertigo longer than 2 weeks. All of the 14 patients showed the apogeotropic nystagmus provoked by the head movements of the head in the spine position suggestive of cupulolithiasis of the lateral canal BPPV. The nystagmus has characteristics of horizontal gaze (presence of posterior canal) and target trial. The patients were required to perform the head tilt to the affected side for 10 seconds after 30 seconds of the onset in the lateral head position showing more intense nystagmus using an infrared CCD devices for vestibular examination such as HHI directional test and upright nystagmus (found in 4 subjects). In the latter case, the HHIT training causes the transformation into the geotropic nystagmus, which was successfully cured by the log roll maneuver.

Debris is possibly detached and released from cupula and migrate into canal, leading the change from apogeotropic to geotropic nystagmus, which was successfully cured by the log roll maneuver (Fig.4).

Debris should be able to be detached and released from cupula and migrate into canal, leading the change from apogeotropic to geotropic nystagmus, which was successfully cured by the log roll maneuver (Fig.4).

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### Results

Successful improvement ratio (%): 7/14 cases (50.0%) of all cases treated at 1 and 4 weeks period. Each session ended with a 20-hop trial. HHI exercises were performed in 14 cases with intractable horizontal canal BPPV exhibiting persistent nystagmus toward the affected side. The spine forward (Fig.4) or backward tilt (Fig.5) was performed at the beginning of each session. There were two ways that the HHI training leads to disappearance of the apogeotropic nystagmus. One is the direct transformation into the geotropic nystagmus, which was successfully cured by the log roll maneuver (Fig.4). Debris in the lateral canal is associated with the cupulolithiasis of BPPV, an Exercise Therapy for the Cupulolithiasis of BPPV was performed in 14 cases with intractable horizontal canal BPPV confirmed by the criteria as follows:

### CONCLUSIONS

These results suggest that HHIT exercises based on the concept of removal of debris from the cupula would appear to be feasible as a new therapy for cupulolithiasis associated with intractable horizontal canal BPPV.