Epiblepharon is a condition in which a fold of redundant skin and the underlying pretarsal orbicularis muscle overlaps the eyelid margin, pushing the eyelashes against the cornea. This condition can result in corneal erosion and increased astigmatism.1-3 Epiblepharon is most often bilateral and symmetrical.4 However, we have often observed asymmetric epiblepharon in our clinical practice, and it is more frequently found in patients with head tilt. To the best of our knowledge, other than a single case report,5 the presence and symmetry of epiblepharon in patients with head tilt has not been evaluated. In the present study, we investigated epiblepharon symmetry in patients with head tilt and analyzed the association between the 2 conditions.

Methods

This study retrospectively reviewed the medical records of 1074 patients who had received a diagnosis of epiblepharon between January 1, 2006, and October 31, 2013, at Seoul National University Bundang Hospital. Using electronic medical records and medical photographs, we collected data on sex, age, extent and asymmetric presentation of epiblepharon, and direction and cause of head tilt.

The presence and direction of head tilt were identified by the same physician (N.K.) and the causes of head tilt, including superior oblique palsy (SOP), congenital muscular torticollis, and dissociated vertical deviation (DVD), were evaluated. Superior oblique palsy was diagnosed when inferior oblique overaction and superior oblique underaction were present. Congenital muscular torticollis was diagnosed by a pediatric orthopedic surgeon when the patient had unilateral sternocleidomastoid muscle hypertrophy or spasticity. Dissociated vertical deviation was characterized by slow vertical drifting of the nonfixating eye when the other eye was fixating on a target. If there was no definite cause of head tilt, it was classified as unknown origin.
On a thorough literature search, we found no definition of asymmetric epiblepharon. We defined asymmetric epiblepharon as a difference of the extent of epiblepharon between the 2 eyelids of more than one-fourth of the eyelid length (Figure 1). The degree of difference of epiblepharon or the degree of head tilt was not evaluated. The protocol for this study was approved by the institutional review board of Seoul National University Bundang Hospital, with waiver of the need for informed consent. The conduct of the study adhered to the tenets of the Declaration of Helsinki.6 Statistical analyses were performed using SPSS, version 19.0 (SPSS Inc).

Results
All 1074 children with epiblepharon (536 boys [49.9%], 538 girls [50.1%]) included in the study were Korean and their mean (SD) age was 5.4 (2.6) years. Among them, 38 patients (3.5%) showed head tilt. No significant difference was identified in sex (P = .76, \( \chi^2 \) test) or age (5.35 vs 5.40 years, difference 0.05; 95% CI, −0.43 to 0.33; \( P = .74; \) tailed, unpaired \( t \) test) between patients with and those without head tilt. The most common cause of head tilt was SOP (18 patients [47.4%]), followed by congenital muscular torticollis (10 [26.3%]) and DVD (3 [7.9%]). Of the 38 patients with head tilt, 23 individuals (60.5%) underwent subsequent surgical correction of epiblepharon. Head tilt persisted after epiblepharon was surgically corrected.

Among the 38 patients with head tilt, asymmetric epiblepharon was present in 34 individuals (89.5%); among the 1036 patients without head tilt, 80 children (7.7%) showed asymmetric epiblepharon. The proportion of asymmetric epiblepharon in the patients with head tilt was significantly higher than that in those without head tilt (\( P < .001; \) Fisher exact test) Of the 34 patients with head tilt and asymmetric epiblepharon, 29 children (85.3%) showed more severe epiblepharon in the head-tilted side (13 [44.8%] on the right side, 16 [55.2%] on the left side). The direction of the tilt was consistent with the side having more severe epiblepharon (\( P = .009; \) Fisher exact test).

Characteristics of Epiblepharon
In the SOP group, 17 of 18 children (94.4%) had asymmetric epiblepharon; in 16 of those patients (94.1%), the direction of tilt was consistent with the side having more severe epiblepharon. In the congenital muscular torticollis group, 9 of 10 patients (90.0%) had asymmetric epiblepharon and, in 7 of those individuals (77.8%), the direction of tilt was consistent with the side having more severe epiblepharon. In the DVD group, all 3 patients had asymmetric epiblepharon; in 2 of those 3 patients (66.7%), the direction of tilt was consistent with the side having more severe epiblepharon. In the group of 7 children (18.4%) with unknown origin of epiblepharon, 5 children (71.4%) had asymmetric epiblepharon; in 4 of those 5 children (80.0%), the direction of the tilt was consistent with the side having more severe epiblepharon. No significant difference was identified in the prevalence or concordance of the direction of tilt and the side with more severe epiblepharon between the groups (\( P = .44 \) and \( P = .29 \), respectively, Fisher exact test) (Table).

Discussion
We found that epiblepharon was asymmetric in most patients with head tilt (89.5%) in contrast to bilateral and symmetric epiblepharon in the general population.7 In addition, the direction of head tilt and the side with more severe epiblepharon was consistent in most of the patients (85.3%). This finding suggests that head tilt is strongly associated with epiblepharon asymmetry. However, epiblepharon asymmetry did not differ according to the cause of head tilt. Therefore, it can be deduced that head tilt—not the cause of head tilt—likely leads to epiblepharon asymmetry.
Jampolsky found that anomalous head posture might be due to a superior rectus contracture occurring after prolonged DVD. Further research is needed to determine the underlying mechanism of this type of head tilt.

We are aware of only 1 case report describing a patient with head tilt and asymmetric epiblepharon; the head tilt resolved once epiblepharon was repaired, implying that asymmetric epiblepharon might cause head tilt. In contrast, our study found that head tilt can cause asymmetric epiblepharon; head tilt persisted even after epiblepharon was surgically corrected.

There are several possible mechanisms by which head tilt causes asymmetric epiblepharon. Patients with head tilt and epiblepharon generally have facial asymmetry, which leads to unilateral epicanthal folds and an overriding skinfold on the tilted side, which in turn contributes to more severe epiblepharon on the same side. This theory is supported by previous reports that patients with prominent epicanthal folds frequently experience severe ocular irritation due to contact of the eyelash with the cornea. Jones found that most cases of congenital torticollis are accompanied by unilateral epicanthal folds on the side of the head tilt and suggested that a unilateral epicanthal fold could be an early diagnostic indicator of congenital torticollis.

There are several limitations to our study. First, as a retrospective review, a selection bias may be present. Second, the severity and duration of head tilt were not evaluated. Mild head tilt of a short duration might not be sufficient to induce epiblepharon asymmetry. Prospective studies examining a larger number of patients with head tilt are warranted to investigate the effect of angle and duration of head tilt on epiblepharon asymmetry.

Conclusions

In this retrospective study of patients with epiblepharon and head tilt, most epiblepharon was asymmetric, with greater severity on the head-tilt side. These findings suggest that head tilt should be evaluated in patients with asymmetric epiblepharon.