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LETTER TO THE EDITOR

Understanding the parameters used to classify the shape of tarsal plates

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Dear Editor,

This letter is in response to the article "Anatomical description of the upper tarsal plate for reconstruction" by Coban et al. published in July 2018 [1]. Specifically, we have concerns regarding the relationships used to characterize the shape of the upper tarsus as sickle, triangular, or trapezoidal.

The relationships are as follows:

1. central height of tarsus/width, or $\left(\frac{hc}{w}\right)$
2. (medial height of tarsus + lateral height of tarsus)/width, or $\frac{hm+hl}{w}$.

The first expression is used to differentiate sickle from the other two shapes. A tarsus with a ratio of <0.35 is sickle shaped. A ratio greater than or equal to 0.35 requires the use of the second expression. Tarsal plates are triangular when the ratio in the second expression is less than or equal to 1.6, and trapezoidal when the ratio is greater than 1.6.

The problem lies in the inability of the second expression to differentiate between the two shapes. According to the results, both triangular and trapezoidal shapes were found. However, the paper also states that the range of $\frac{hm+hl}{w}$ was found to be between 0.3 and 0.4 (i.e., all less than 1.6). Thus, all the tarsal plates that had a $\left(\frac{hc}{w}\right)$ greater than 0.35 were triangular and none were trapezoidal.

The relationship can also be shown to be problematic by a theoretical application. Imagine an upper tarsal plate shaped like an isosceles trapezoid where height = 2, the superior border = 3.9 and the inferior border = 4.0. For this plate, the ratio of $\left(\frac{hc}{w}\right)$ is 0.5, so it is either triangular or trapezoidal. The ratio of $\frac{hm+hl}{w}$ is $\frac{2+2}{4}$, or 1. Consequently, even a trapezoid would be found to be triangular by the above parameters.

These relationships were originally proposed by Nagasao et al. in the 2011 paper "Morphological analysis of the upper eyelid tarsus in Asians" [3]. The authors did not include their measurements of the dimensions of the tarsus, and only reported the percentage of tarsal plates that were sickle, triangular, or trapezoidal. Considering the traditional teaching that the central height of the upper tarsus is typically 8–12 mm and the width averages 25 mm, it is difficult to imagine a plate where the sum of the lateral and medial height can be 1.6 × the length of the width [2].

One possible interpretation of this quandary is that the relationship has been translated incorrectly. If one replaces the width in the second expression with central height, or $\frac{hm+hl}{hc}$, then the 1.6 ratio could be a useful cutoff. Inserting the average of each of the three heights from the paper by Coban et al. results in a ratio of 1.33. Using the theoretical tarsus above, the ratio of the second expression would instead be $\frac{2+2}{4}$, or 2, and the shape would be correctly identified as a trapezoid. This substitution allows for meaningful shape differentiation within their classification system.

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References

1. Coban I, Sirinturk S, Unat F, Pinar Y, Govsa F (2018) Anatomical description of the upper tarsal plate for reconstruction. Surg Radiol Anat 40:1105–1110
2. Dutton JJ (2019) Clinical anatomy of the eyelids. In: Yanoff M, Duker J (eds) Ophthalmology, 5th edn. Elsevier Saunders, Edinburgh, pp 1259–1262
3. Nagasao T, Shimizu S, Ding W, Jiang H, Kishi K, Imanishi N (2011) Morphological analysis of the upper eyelid tarsus in Asians. Ann Plast Surg 66(2):196–201