

## Hockey as an advance organizer for oculoplastics teaching

The expansion of medical knowledge confronts learners with information overload. As such, it is advantageous to explore methods to efficiently teach and keep learners engaged.<sup>1</sup> Strategies that integrate teaching with prior knowledge are one of the top 10 factors that positively influence learning.<sup>2</sup>

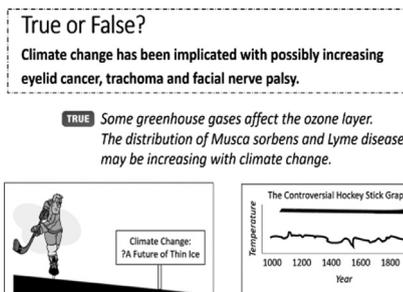
Advance organizers (AOs) are educational tools that help learners link and structure new information with prior

knowledge.<sup>3,4</sup> In this learner satisfaction survey, we examine the utility of AOs in oculoplastic surgery teaching. Because ice hockey is the most popular sport in Canada, hockey-related AOs were incorporated into an introductory 3-hour lecture on oculoplastics (see Table 1).

This study was approved by the Michael Garron Hospital Research Ethics Board and compliant with the Declaration of Helsinki. The study population consisted of 42 beginning ophthalmology residents who attended the Canada-wide "Introduction to Ophthalmology Course" in June 2022 at

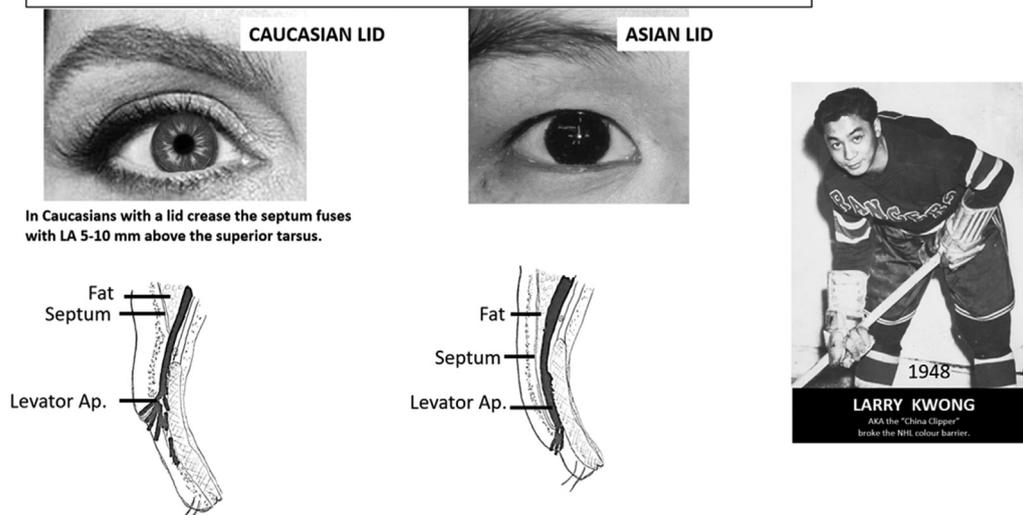
**Table 1—Examples of hockey advance organizers used during lecture.**

Teaching objective	Oculoplastics details	Hockey advance organizer
Team building and camaraderie	Introductory slide: "Oculoplastics Hockey School"	A group photographs of the students taken at their welcoming party was edited to have each resident have a Team Canada Hockey jersey. In the team graphic, in place of hockey sticks, a hockey scalpel blade was used.
Introduction to topic	The components of oculofacial plastic surgery (oculoplastics)	Oculoplastics is likened to the hat trick of eyelid, lacrimal, and orbital diseases. The inclusion of cosmetics and oculofacial surgery is a Texas hat trick or pants trick.
Eyelid anatomy	Tarsus of the eyelid	The tarsus was compared to the protective hockey pads worn by players.
Eyelid anatomy	Grey line and lash aberrancy	A hockey stick scalpel blade was used to split the lid at the grey line. The importance of identifying the grey line was compared with the blue line on a hockey rink and the consequences of lash aberrancy with the penalty of being "offside."
Eyelid anatomy and equity, diversity, and inclusion	The anatomic difference between Asian and Western eyelid anatomy	Larry Kwong, a Chinese hockey player with low lid folds, was shown. Larry Kwong broke the National Hockey League colour barrier in 1948. See Figure 1.
Introduction to the nasolacrimal system	Epiphora	The nasolacrimal system and tearing were introduced by showing a graphic of Toronto hockey fans crying over the 54-year Stanley Cup drought.
Trauma and prevention	Orbital fractures	A picture of the <i>Mona Lisa</i> with a hockey helmet and cage was shown. It was stated, "To keep your Mona Lisa looks, prevention is the best treatment."
Orbital trauma	Mechanisms of orbital fracture	Hockey pucks striking the orbital rim versus the globe were used to illustrate the buckling versus hydraulic theories.
Orbital tumours	Orbital lymphoma with salmon patch lesion and infiltrative mass on the scan	The National Hockey League has the same initials as non-Hodgkins lymphoma (NHL) and reminded learners that orbital lymphoma is usually the non-Hodgkins' variant.
Diagnostic prediction models	Risk stratification of patients undergoing temporal artery biopsy	An online betting commercial with a famous hockey star was shown. Instead of gambling, learners are suggested to choose wisely using a diagnostic prediction model for giant cell arteritis.
A culture of learning from mistakes	Orbital diagnosis. A table of the most common causes of proptosis and orbital tumours was shown.	It was emphasized that orbital diseases may not follow the expected pattern, but as long as we learn from our mistakes, we can still achieve "greatness." The clothes dryer from Sidney Crosby's childhood was shown with dents and puck marks. Crosby used to practice hockey in the basement, and his errant shots hit the dryer.
Climate change	Skin cancer, trachoma, Bell's palsy (Lyme disease)	A graphic of a hockey player contemplating a future of thin ice and an approximation of Michael Mann's controversial "hockey stick" climate change graph are shown to discuss climate change.
Land acknowledgement	Not applicable	A hockey jersey of the <i>Indigenous</i> peoples of Tkaronto was used as a graphic.
Break time between lectures	Not applicable	A picture of a Zamboni during intermission was used during the lecture break at halftime.



GCA, giant cell arteritis.

In Asians, the pre-aponeurotic fat sits lower than in Western lids and there is often no lid crease.



**Fig. 1**—In this teaching slide, the racial differences in upper eyelid anatomy segue into a hockey-related discussion on equity, diversity, and inclusion. (Photograph of Larry Kwong GVM #25056: permission obtained from Gwyneth Evans, Research and Communications Coordinator, Museums and Archives of Vernon, BC; <https://vernonmuseum.ca/notable-citizens/larry-kwong/>.)

the University of Toronto. The in-person “Introduction to Oculoplastics” lecture began by describing what ice hockey was, explaining that ice hockey was Canada’s predominant official sport, and comparing ice hockey to field hockey. It was disclosed that hockey analogies would be used as AOs during the lecture to introduce or scaffold the oculoplastics information and as a segue to topics including climate change and equity, diversity, and inclusion (Fig. 1).

Immediately after the lecture, the residents rated their perceived utility of the AOs for learning using a visual analogue scale anchored at 0 (strongly disagree) and 10 (strongly agree), with 5 being neutral. The response rate for the voluntary survey was 37 of 42 residents (88%), who were, on average, 29 years of age, with 20 of 36 (56%) male. Thirty-two of the learners (87%) were from Canada, and 5 (13%) were from the Caribbean. Twelve learners (32%) did not play or watch ice hockey or field hockey.

Twenty-two students (60%) felt that the AOs helped their learning, 9 (24%) were neutral, and 6 (16%) did not find the AOs helpful for their learning. The survey margin of error was 5.6%. The average rating of the AOs for learning was  $6.5/10 \pm 2.3$ .

On multivariable linear regression with an adjusted  $R^2$  of 0.242, there was no heteroskedasticity, no omitted variable bias, and no multicollinearity. There was no statistically significant association between the rating of the AOs and age ( $p = 0.088$ ), gender ( $p = 0.992$ ), familiarity with ice hockey ( $p = 0.410$ ), or Canadian residence ( $p = 0.169$ ). Familiarity with field hockey was positively associated with a higher AO rating ( $p = 0.005$ ).

AOs can enhance student motivation and student engagement and improve comprehension,<sup>3</sup> which was supported by the majority of survey comments. Because AOs may incorporate diverse spheres of information, they may promote innovative thinking and may teach learners to develop scaffolding techniques for their future adaptive learning. AOs are disadvantageous if they cause information overload because learners cannot use them to bridge information gaps.

In 2022, the residents ( $n = 31$ ) graded the oculoplastics lecture at 4.65/5. In 2021, a different group of residents ( $n = 27$ ) evaluated the same introductory oculoplastics lecture delivered by the same speaker (E.I.) with similar slides but no hockey-related AOs at 4.24/5. AOs may have contributed to an 8% improvement in the lecture evaluation, but comparing the lecture scores from different years is not wholly accurate because a different group of residents was involved. At the time of submission, the average score for all 51 of the 2022 course lectures was unavailable. In 2021, the average lecture score was 4.59/5.

In summary, 60% of beginning ophthalmology residents felt that a lecture with hockey-related AOs helped them learn oculoplastics. Although AOs can enhance the subjective appreciation of ophthalmology teaching by learners, AOs with a widespread appeal should be used.

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Originally received Aug. 23, 2022. Accepted Oct. 22, 2022.

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## References

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1. Cutrer W, Spickard III W, Triola M, et al. Exploiting the power of information in medical education. *Med Teach* 2021;43(suppl 2):517–24.
2. Hattie J. 250+ Influences on student achievement [Internet]. Visible Learning Limited Partnership and Cognition Education Group, 2017. Available at: <https://visible-learning.org/wp-content/uploads/2018/03/VLPLUS-252-Influences-Hattie-ranking-DEC-2017.pdf> (accessed 13 July 2022).

3. Ing E, Tyndel F. *Award-winning medical teaching*. Toronto: EBI Publishing; 2022.

4. Ausubel D. The use of advance organizers in the learning and retention of meaningful verbal material. *J Educ Psychol* 1960;51:267.

## Footnotes and Disclosure

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We thank Gwyneth Evans from the Museums and Archives of Vernon, BC, for permission to use the photograph of Larry Kwong. The hockey clipart image in Table 1 was from the free clip art site <https://clipartix.com/hockey-clipart-image-16604/>. We thank Kathy Cao and Sandra Gauci for administrating the Toronto Ophthalmology Resident Introductory Course.

The authors have no financial or personal relationships that would bias this work.