The Ophthalmology Surgical Competency Assessment Rubric for Lateral Tarsal Strip Surgery

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Purpose: To produce an internationally valid tool to assess skill in performing lateral tarsal strip surgery.

Methods: A panel of 7 content experts adapted a previously published tool for assessing lateral tarsal strip surgery by using a modified Dreyfus scale of skill acquisition and providing behavioral descriptors for each level of skill in each category. The tools were then reviewed by 11 international content experts for their constructive comments.

Results: Experts' comments were incorporated, establishing face and content validity.

Conclusions: The tool International Council of Ophthalmology-Ophthalmology Surgical Competency Assessment Rubric for Lateral Tarsal Strip Surgery has face and content validity. It can be used globally to assess lateral tarsal strip surgical skill. Reliability and predictive validity still need to be determined.

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In the United States, the Accreditation Council for Graduate Medical Education has mandated that all residency training programs (including ophthalmology) teach and assess 6 general competencies (i.e., medical knowledge, communication and interpersonal skills, patient care, professionalism, practice-based learning, and systems-based practice).[1,2] Presently, surgery is included in the "patient care" competency, but the American Board of Ophthalmology and other organizations have recommended that surgery be split from patient care to become the seventh competency. To fulfill the Accreditation Council for Graduate Medical Education mandate ophthalmic residency, programs need valid assessment tools to show that surgical competence has been achieved. The authors believe such assessment tools should be designed to teach and assess. These tools should be used for summative (final grade) and formative (designed to improve performance) feedback. The authors' objective was to develop a standardized, internationally valid tool to teach and assess an ophthalmologist's competence in performing lateral tarsal strip surgery (LTS). Specifically, this tool can be used to assess either resident or fellow competence.

Gauba et al.[3] previously described the Ophthalmic Plastic Surgical Skill Assessment Tool. This tool divides LTS skill into 18 steps, which are scored on a 5-point Likert scale. The scale anchors are: 1 = "poorly or inadequately performed," 3 = "performed with minor errors or some hesitations," and 5 = "performed well with no prompting or hesitation." There are no scale anchors for scores of 2 or 4. Although clearly a good start, the scale could be improved by the addition of behavioral or skill-based anchors for evaluators to use when assessing residents' competence.

The present study describes the authors' methods of designing and validating (for face and content validity) an assessment tool for LTS including a skill-based rubric.

METHODS

A group of content experts (the authors), representing Argentina, India, United Arab Emirates, United Kingdom, and the United States worked together via a Google communication site. The authors started with the 18 steps of the Ophthalmic Plastic Surgical Skill Assessment Tool and created descriptions of behavior expected at each step. These descriptions are known as behavioral anchors. Face validity was demonstrated by developing a rubric draft based on a modified Dreyfus model of skill acquisition (novice, beginner, advanced beginner, competent, expert). The "expert" category was omitted because residents are not expected to become experts during training. Behavioral anchors were written by the authors and modified repeatedly through the Google communication site until all authors were satisfied. Anchors were written for each scoring categories for all 18 steps.

The authors solicited input from a second group of 11 international content experts who reviewed the draft and made suggestions. The international content experts were selected for their expertise and to try and assure global representation. These experts teach ophthalmic plastic surgery in Argentina, China, Egypt, India, Italy, Peru, United Kingdom, and the United States. Their suggestions were cataloged, reviewed by the authors, and revisions made to produce the final draft which the authors call the Ophthalmology Surgical Competency Assessment Rubric for LTS (OSCAR:LTS; Table). The International Council of Ophthalmology (ICO) approved this assessment tool, and thus the authors have labeled it the ICO-OSCAR:LTS. The specific behavioral narrative anchors in the rubric provide the raters with objective benchmarks for comparative

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International Council of Ophthalmology-Ophthalmology Surgical Competency Assessment Rubric for Lateral Tarsal Strip Surgery (ICO-OSCAR:LTS)

Date_____ Resident_____ Evaluator_____		Novice (score = 2)	Beginner (score = 3)	Advanced beginner (score = 4)	Competent (score = 5)	Not applicable. done by preceptor (score = 0)
1	Local anesthetic administration: location and volume	Inappropriate amount. Anesthetic too deep or too superficial (i.e., scraping bone or periosteum or blanching). Wrong location leading to pain later in the procedure.	Excessive amount of anesthesia, causing chemosis and interfering with dissection or insufficient amount/suboptimal placement.	Appropriate amount of anesthetic applied in near optimal locations. Does not interfere with completion of case.	Infiltration of local anesthetic (with epinephrine) extending from the lateral canthal angle down to the orbital rim periosteum avoiding larger vessels. Sufficient volume to deliver analgesia and assist hemostasis without inducing chemosis.	—
2	Preparation and draping: clear surgical field	Inadequate drape position. Hair sticking out. Poorly wrapped so unravels during the procedure. Drape interfering with surgical access. Sudden, direct focusing of overhead lamp on patient's face.	Drapes placed adequately, but exposure is not optimal and drapes become loose during the procedure. Light not angled optimally.	Drapes placed adequately, but exposure is not optimal. Light angled appropriately.	Good access to the lateral canthus and lateral orbital rim. Light angled from above patient's head, allowing gradual adjustment to brightness. Face exposed from hairline to below nose to allow comparison of right and left canthal positions during surgery.	—
3	Incision: location, length, direction, and orientation	Poorly constructed incision. Too short/long or against relaxed skin tension line. Inappropriate depth. Anatomy not appropriately exposed.	Incision is too long with poor respect for relaxed skin tension line.	Incision is small, but surgeon realizes and lengthens it. Incision follows relaxed skin tension line.	Incision extending from the canthal angle approximately 5–10 mm laterally along the relaxed skin tension line to expose the orbital rim.	—
4	LTS preparation: releasing eyelid attachments	Poor hemostasis throughout the procedure complicating dissection view. Inadequate release of inferior crux/failure to adequately identify and expose the tendon. Loss of plane of dissection.	Incomplete release of inferior crux. Has to revise this step later in the procedure after being instructed. Some difficulty with hemostasis.	Incomplete release of inferior crux. Realizes mistake without instruction and revises later in the procedure. Hemostasis is adequate.	Identification and release of the inferior crux of the lateral canthal tendon with minimal dissection ensuring complete release of the lower eyelid from orbital periosteum. Hemostasis achieved to ensure visualization of structures.	—
5	LTS preparation: fashioning the tarsal strip	Poor comprehension of anatomical goals. Strip too short (causing undesirable tension/not reaching periosteum). Poor clearance of conjunctiva/muscle/lashes off strip.	Excessive removal of tissue. Strip is thin, making it difficult to place anchoring sutures.	Strip is thin but still holds sutures adequately.	Strip size is appropriate with correct clearance of skin and tarsal conjunctiva. Inferior retractors and conjunctiva dissected from the inferior tarsal margin. Gray-line split with release of the posterior lamella.	—
6	Dissection: creating access to orbital rim	Periosteum not adequately exposed. Poor dissection technique causing collateral damage to tissue including periosteum. Excessive bleeding.	Orbicularis muscle overlying periosteum. Difficult access to site of fixation. Unable to manage orbital fat prolapsing in surgical field.	Excessive dissection leading to some orbital fat prolapse. Adequately constricts fat with bipolar cautery.	Lateral orbital periosteum exposed around the tendon attachment site. Dissection allows easy access and visualization of the inner aspect of the lateral orbital rim.	—
7	Suturing: tarsal strip sutured to periosteum on inner orbital rim	Poorly placed sutures on strip failing to anchor strip adequately. Failure to secure 2 firm bites; bites not parallel/in the same plane resulting in asymmetric tension/rotation of strip. Great difficulty in anchoring periosteal suture—needle bent or tissue torn.	Sutures are placed adequately after multiple attempts with inadequate purchase of orbital periosteum.	Sutures are passed on the second attempt. Adequate periosteal fixation.	Uses appropriate suture material. Suture passed through tarsal strip so as to ensure good apposition to the periosteum once plicated. Suture placed inside the orbital rim periosteum to ensure good apposition to the globe.	—

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Date_____ Resident_____ Evaluator_____		Novice (score = 2)	Beginner (score = 3)	Advanced beginner (score = 4)	Competent (score = 5)	Not applicable. done by preceptor (score = 0)
8	Suturing: eyelid height and position	Asymmetry of the 2 lateral canthi and/or failure to account for contralateral canthal height. Over tightening/ poorly secured lateral periosteal suture resulting in medialization/drag of lateral canthus. Lateral canthus placed/reformed too low at same or lower height than medial canthus.	Mild asymmetry of canthal height or inaccurate estimation of required canthal height. Excessive/ insufficient tension.	Accurate estimation of required canthal height. Excessive/ insufficient tension.	Desired eyelid height and position are achieved. Strip reattached securely to the periosteum with sufficient tension. Suture tied in such a position to avoid palpable knot at the orbital rim postoperatively.	—
9	Suturing: canthus, muscle, and skin closure	Failure to reform lateral canthus. Poor suture technique and/or result—difficulty in mounting sutures, multiple attempts at placement, alignment of sutures poor.	Canthal angle is misaligned. Inadequate wound closure or inappropriate orbicularis excision.	Canthal angle is roughly in place but not perfectly aligned. Realizes mistake and corrects it.	Lateral canthal angle reformed with or without an absorbable suture. Orbicularis preserved and plicated superiorly to the orbital rim periosteum to support the lower eyelid. Excess skin trimmed, and skin closed without undue tension on the wound.	—
	Global indices					
10	Maintaining hemostasis	Poor anatomical knowledge of vasculature. Incorrect settings or usage of electrocautery resulting in burns, collateral damage, or failure to adequately achieve hemostasis.	Has trouble identifying source of bleeding. Cautery is applied to the area instead of the point of bleeding.	Hemostasis is good overall but has trouble managing larger bleeders.	Electrocautery used effectively to achieve hemostasis during each step of the procedure, allowing for clear visualization of anatomy.	—
11	Adequate tissue visualization	Failure to adhere to surgical planes. Failure to expose tissue appropriately during dissection.	Unable to consistently attain good surgical exposure. Corrects mistake(s) with instruction.	Reasonable surgical exposure but not respecting surgical planes consistently. Realizes mistakes and attempts to correct.	Sufficient incision size, hemostasis, and retraction to allow for consistently good tissue exposure.	—
12	Respect of tissue/ tissue handling	Repeated unnecessary handling of tissue. Crush injuries through inappropriate use of forceps. Damage to tissue by repeated placement of sutures.	Some unnecessary tissue handling and mild tissue damage occurs.	Minimal unnecessary tissue handling without tissue damage.	Good knowledge of the regional anatomy with efficient manipulation of tissues and minimal dissection required to create and plicate the strip. Demonstrated spatial awareness within the surgical field.	—
13	Knowledge of instruments	Poor or no knowledge of instruments. Inappropriate combinations of suture holders, scissors, and forceps resulting in unsafe surgery or collateral damage.	Occasionally uses an inappropriate instrument and does not realize it.	Occasionally uses an inappropriate instrument but realizes mistake and corrects it.	Appropriate instruments used throughout case.	—
14	Suture needle mounting technique	Great difficulty in mounting suture, requiring multiple attempts. Suture needle not placed in the correct position on the needle holder. Damage to needle/blunting of tip/ needle bent.	Able to mount suture but at incorrect location. Poor needle stability within the needle holder.	Able to mount and position needle on the needle holder but still allows for rotation and instability of the needle.	Semicircular needle mounted two thirds along its length on the needle holder, allowing for a firm grasp of the needle without allowing for needle rotation while held.	—

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Date_____ Resident_____ Evaluator_____		Novice (score = 2)	Beginner (score = 3)	Advanced beginner (score = 4)	Competent (score = 5)	Not applicable. done by preceptor (score = 0)
15	Speed and efficiency of movements	Repeated unnecessary movements. Slow and hesitant. Multiple attempts at same maneuver. Poorly positioned hands and/or body posture to aid with the procedure.	Several inefficient movements requiring instruction.	Minimal unnecessary movements but some hesitations.	Purposeful and efficient dissection and suturing. Surgical time of <45 minutes per side.	—
16	Overall flow of the procedure	Poor forward planning. Lacking in fluency. Hesitant. Multiple repeated tasks.	Stops and starts throughout the procedure.	Reasonable flow but occasionally indecisive or hesitant.	Structured and logical sequence to the procedure with decisive movements and no hesitation.	—
17	Communication with patient and surgical team	Unsure or uncommunicative with either patient or surgical w, resulting in poor responsiveness to surgical needs.	Inconsistent communication with patient or surgical team.	Communicates with the patient and surgical team consistently but not always clear or unambiguous.	Clear and unambiguous communication with the patient and staff during the procedure to ensure a coordinated and efficient procedure.	—

Comments_____

purposes and provide the learners with specific targets for behavioral change.[4,5]

RESULTS

The comments of the international panel on the initial tool draft included general and specific suggestions. Several reviewers suggested adding new categories to the 18 steps published in the Ophthalmic Plastic Surgery Assessment Tool described by Gauba et al.,[3] and 1 reviewer felt the tool might be too burdensome to complete. Most comments regarded adding items such as preoperative evaluation or operative and postoperative complications. The content experts considered these comments, but felt the tool could become too cumbersome and the goal was to produce a surgical skill assessment tool. Thus, the consensus of the experts was not to add categories. The tool is intentionally rather detailed to achieve the authors' goal of teaching and assessing with the same tool. There were numerous specific suggestions regarding many behavioral descriptors of the rubric. All expert comments were considered, and the authors incorporated appropriate suggestions, thus establishing a level of face and content validity. The authors define face validity as the ability of a tool to measure what is intended to be measured (e.g., skill at performing LTS). A tool has content validity if it addresses all important aspects of what is being assessed (e.g., all steps of a surgical procedure). The table summarizes the scoring rubric devised by international consensus.

DISCUSSION

Lateral tarsal strip surgery is one of the most common ophthalmic plastic surgical procedures performed by ophthalmology residents. In the United States and the United Kingdom, ophthalmology residency programs are required to show that in aggregate, residents in a program have performed a specified "minimum" number of strabismus surgeries (quantity) and have an "equivalent experience," but there are no standard requirements or measures to assess how well the resident did conducting the surgery (quality). Globally, much more variability exists. Indeed, many countries do not even require a minimum number of surgeries, let alone standards for competence. One of the authors (K.C.G.) participates in the Program Director Courses of ICO designed to teach program directors how to become more effective educators. Having interacted with more than 1,000 program directors around the world, the authors were prompted to undertake the present study, because there was clear feedback about the desire and need for a more standardized system for surgical education and evaluation.

A variety of surgical skill competency assessment tools have been developed by groups of individual ophthalmic medical educators; however, most have focused on cataract surgery.[6–12]

The authors started with a previously published assessment tool[3] and produced an internationally applicable rubric based on the modified Dreyfus model of skill acquisition (novice, beginner, advanced beginner, competent) by developing behavioral anchors explicitly defined for each level in each step of the surgical procedure. The authors define a rubric as an explicit set of criteria used for assessing a particular type of work or procedure. The authors chose to modify the Dreyfus scale by eliminating the "expert" category because they feel that a resident (or fellow) never achieves expertise prior to graduation. The specific behavioral narrative anchors in the rubric provide the raters with objective benchmarks for comparative purposes and provide the learners with specific targets for behavioral change. It is hoped that this will offer a platform for standardization for teaching, training, and evaluation in this domain. Face and content validity have been established by incorporating comments from a group of content experts representing Africa, Asia, Europe, and North and South America. Similar tools have been developed for ICO-OSCAR: phacoemulsification,[13] ICO-OSCAR:extracapsular cataract,[13] and ICO-OSCAR:small incision cataract[14] surgical skill.

This assessment tool serves 2 purposes: first, it will decrease subjectivity of the assessment by clearly defining for the assessor what behavior must be observed for each level of proficiency; and second, the rubric clearly communicates to the learner what is expected to attain competence, and thus this tool can be used for assessment and teaching. Ultimately, it is likely governing bodies will want to assess surgical skills as part of recertification. The ICO-OSCAR:LTS tool could be used for

this purpose. Additionally, this tool will allow practicing ophthalmologists the ability to self-assess in a standardized manner and serve as a template for development of similar rubrics for other oculoplastic procedures.

The ICO-OSCAR:LTS has face and content validity and can be used internationally to teach and assess resident ophthalmic plastic surgical skill. Although the authors have demonstrated that the tool has face validity, further work is necessary to show that different raters will rate the same procedure similarly (inter-rater reliability) and to show that results from the tool do predict ophthalmic plastic surgical skill measured by other methods (construct validity).

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