



Evidence-based Eye Care

Somsanguan Ausayakhun, MD, MHSc.
Professor Emeritus
Department of Ophthalmology
Faculty of Medicine,
Chiang Mai University, Thailand
2020

Evidence-based Eye Care

- **วัตถุประสงค์เชิงพฤติกรรม** หลังจากจบการเรียนการสอนแล้ว นักศึกษาสามารถ **Students are able to:**
 1. **ดูแลสุขภาพตาโดยใช้ หลักฐานเชิงประจักษ์ / การอ้างอิงหลักฐานทางการแพทย์ (Use evidence-based medicine/ eye care as it relates to patient's condition and diagnosis)***
 2. **Consult the medical literature (web-based resources and references materials) to support education and improve patient care***
 3. **วิเคราะห์ผลงานวิจัยทางจักษุวิทยาของผู้อื่นอย่างเป็นระบบ (Critical appraisal)**

*Accreditation Council for Graduate Medical Education (ACGME) core competencies, Upstate Medical University, New York, USA



What is evidence-based eye care?



What is evidence-based medicine?

“การทำเวชปฏิบัติโดยใช้ หลักฐานเชิงประจักษ์ / การอ้างอิงหลักฐานทาง
การแพทย์”

“เวชศาสตร์เชิงประจักษ์”

What is evidence-based eye care/ophthalmology?

“การดูแลสุขภาพตาโดยใช้ หลักฐานเชิงประจักษ์ / การอ้างอิง
หลักฐานทางการแพทย์”

“จักษุเชิงประจักษ์”



Life long learning

“The hardest conviction to get into the mind of a beginner is that the education upon which he is engaged is not ... a medical course, but a life course, for which the work of a few years under teachers is but a preparation.”

William Osler



Sir William Osler (1849-1920)

“Father of Modern Medicine”

- He is one of the founding professor of Johns Hopkins Hospital
- He created the first residency program for specialty training of physicians
- He was the first to bring medical students out of the lecture hall for bedside clinical training



Welch Medical Library, JHU



William Osler Quotes

“Medicine is learned by the bedside and not in the classroom. Let not your conceptions of disease come from words heard in the lecture room or read from the book. See, and then reason and compare control. But see first .”

William Osler

«Listen to your patient, he is telling you the diagnosis»



Sir William Osler
(1849 - 1919)

Shared



William Osler Quotes

Journal club



- ▶ William Osler first introduced the concept of 'Journal club' in 1875



"He who studies medicine without books sails an uncharted sea, but he who studies medicine without patients does not go to sea at all."

William Osler

2



What is evidence-based medicine?

What is EBM?



“Evidence-based medicine is the integration of research evidence with clinical expertise and patient values”



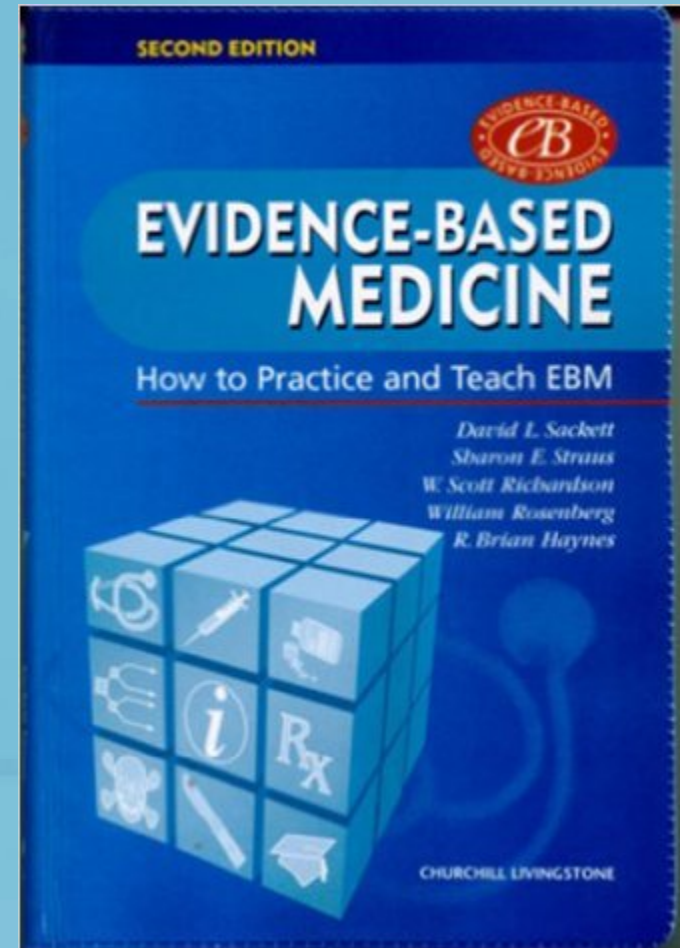
Sackett DL, Rosenberg WMC, Gray JAM, Haynes RB, Richardson WS: Evidence based medicine: what it is and what it isn't. BMJ 1996;312:71-2.



What is evidence-based medicine?

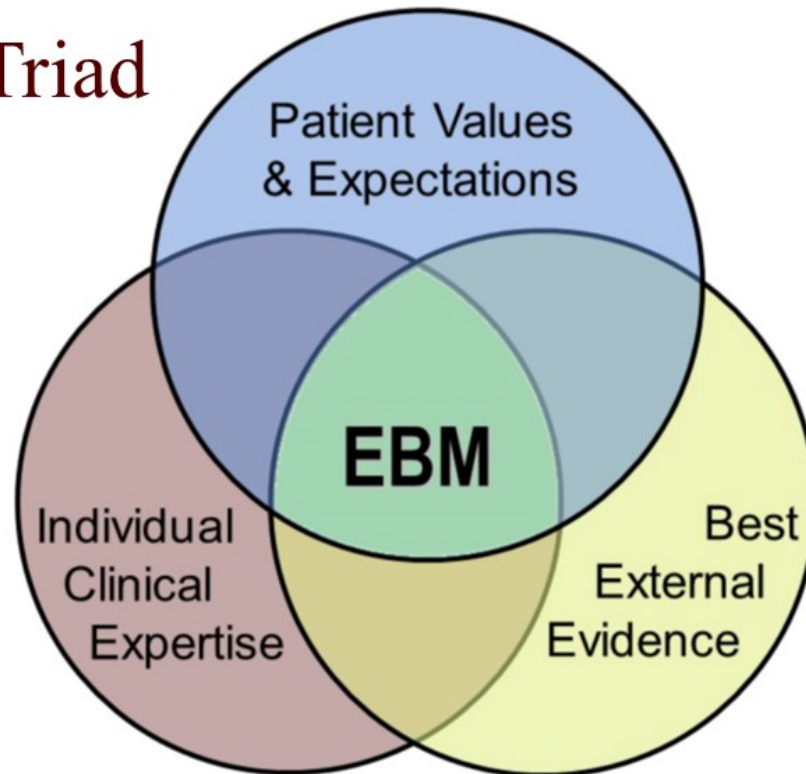
“Evidence-based medicine (EBM) is the process of systematically reviewing, appraising and using clinical research findings to aid the delivery of optimum clinical care to patients”

Rosenberg & Donald



Evidence-based Medicine Triad

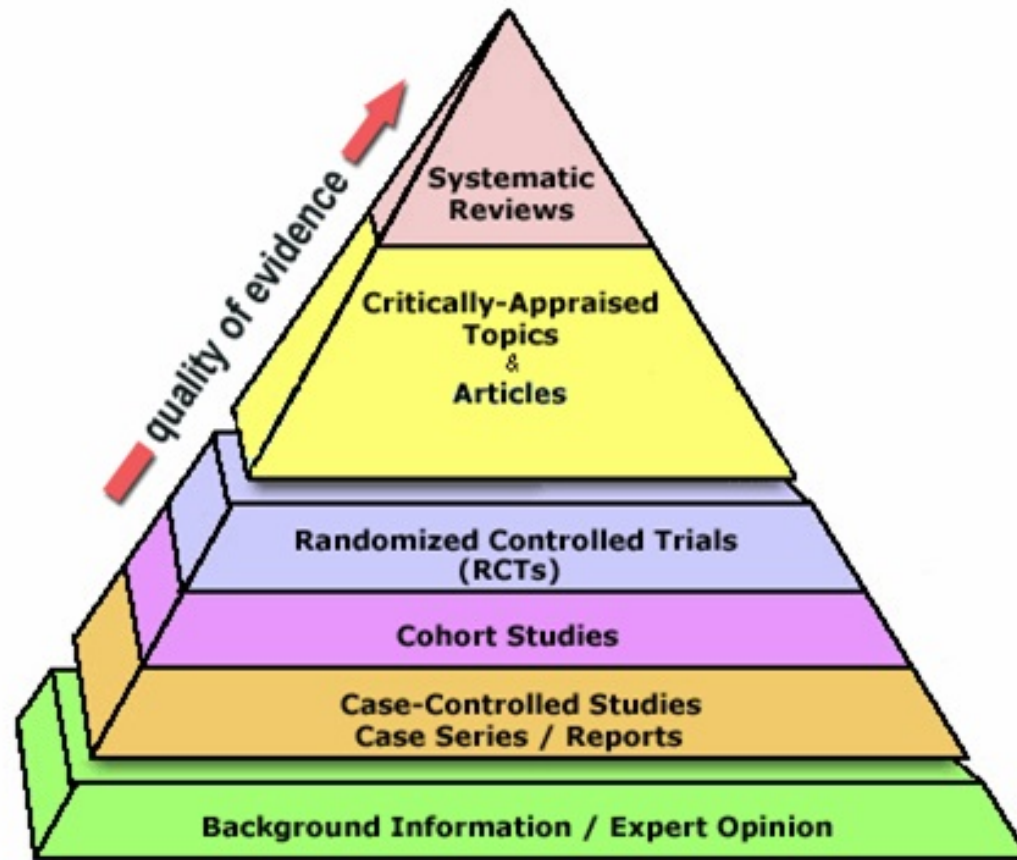
The EBM Triad



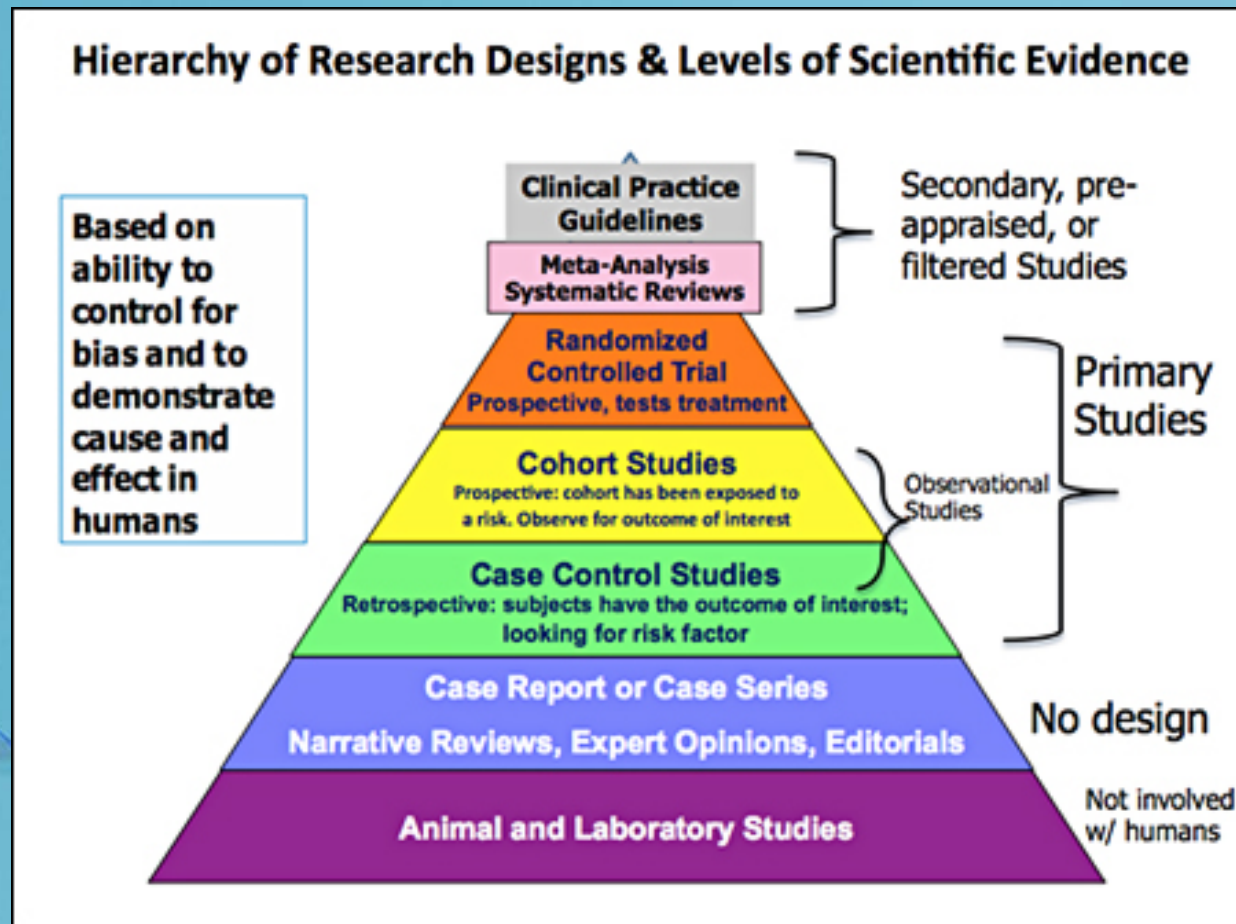
Armstrong, E.C. (2003) Harnessing new technologies while preserving basic values. *Fam Sys & Health*, (21)4, 351-355.



Levels of Evidence



Hierarchy of Study Designs & Levels of Evidence



Steps in EBM process

- 1. Formulate an answerable clinical question**
- 2. Track down the best evidence**
- 3. Critically appraise the evidence**
- 4. Integrate with clinical expertise and patient concerns**



Steps in EBM process

- 1. Formulate an answerable clinical question**
2. Track down the best evidence
3. Critically appraise the evidence
4. Integrate with clinical expertise and patient concerns



Step 1. Formulate an answerable clinical question

What type of question you are asking?

- Clinical finding
- Diagnosis
- Prognosis
- Therapy
- Prevention



Anatomy of question

PICO

P = Population / Patient

I = Intervention

C = Comparison / Control

O = Outcome

T = Time



Clinical questions & Study design

- Diagnosis
- Prevalence
- Incidence
- Risk
- Prognosis
- Treatment
- Prevention
- Cause
- Cross-sectional
- Cross-sectional
- Cohort
- Cohort, Case-control
- Cohort
- RCT
- RCT
- Cohort, Case-control



Steps in EBM process

1. Formulate an answerable clinical question
- 2. Track down the best evidence**
3. Critically appraise the evidence
4. Integrate with clinical expertise and patient concerns



Step 2. Track down the best evidence (online)

- The approach for finding evidence
 - 2.1 Identify search terms and search strategy
 - 2.2 Look for secondary sources
 - 2.3 Search for primary sources



2.1 Identify search terms and search strategy

Following these steps:

2.1.1 Formulate your question (PICO)

2.1.2 Choose your search terms

2.1.3 Turns search terms into a search strategy

2.1.4 Turn a search strategy into results



Scenario:

- An eye resident has a special interest in watching tablet/smart phone of children. He would like to see what evidence is available, particularly on the progression of myopia in children.



2.1.1 Formulate the question

PICO

P = Population / Patient

I = Intervention

C = Comparison / Control

O = Outcome

T = Time



2.1.1 Formulate the question

- Can watching the tablet/smart phone cause the progression of myopia in children?



2.1.2 Choose the search terms

- Can watching the tablet/smart phone cause the progression of myopia in children?

P	I	O



2.1.2 Choose the search terms

- Can watching the tablet/smart phone cause the progression of myopia in children?

P	I	O
Children		



2.1.2 Choose the search terms

- Can watching the tablet/smart phone cause the progression of myopia in children?

P	I	O
Children Teenagers		



2.1.2 Choose the search terms

- Can watching the tablet/smart phone cause the progression of myopia in children?

P	I	O
Children Teenagers Adolescents		



2.1.2 Choose the search terms

- Can watching the tablet/smart phone cause the progression of myopia in children?

P	I	O
Children Teenagers Adolescents	Watching the tablet/smart phone	



2.1.2 Choose the search terms

- Can watching the tablet/smart phone cause the progression of myopia in children?

P	I	O
Children Teenagers Adolescents	Watching the tablet/smart phone Play games	



2.1.2 Choose the search terms

- Can watching the tablet/smart phone cause the progression of myopia in children?

P	I	O
Children Teenagers Adolescents	Watching the tablet/smart phone Play games	Myopia progression



2.1.2 Choose the search terms

- Can watching the tablet/smart phone cause the progression of myopia in children?

P	I	O
Children Teenagers Adolescents	Watching the tablet/smart phone Play games	Myopia progression Axial length longer



2.1.2 Choose the search terms

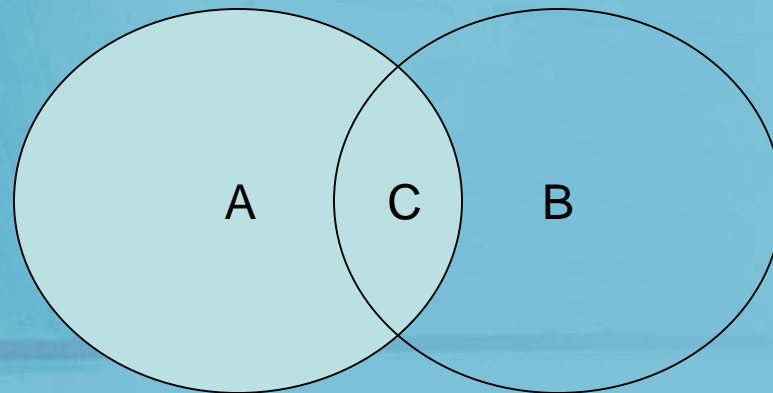
- Can watching the tablet/smart phone cause the progression of myopia in children?

P	I	O
Children Teenagers Adolescents	Watching the tablet/smart phone Play games	Myopia progression Axial length longer Corneal curvature increase



2.1.3 Turns search terms into a search strategy

- OR = combine terms/words where we want either or any of them to appear in an article
- e.g. children (A) OR teenagers (B)

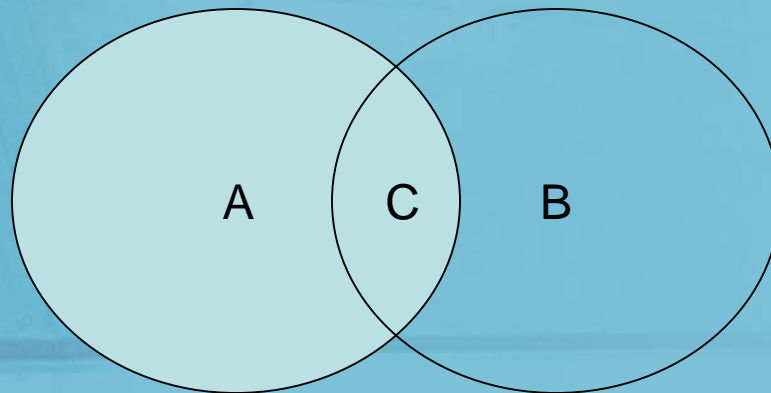


$$OR = A + B + C$$



2.1.3 Turns search terms into a search strategy

- AND = combine terms/words where we want both or all of them to appear in an article.
- e.g. children (A) AND teenagers (B)



AND = C



Step 2. Track down the best evidence (online)

- The approach for finding evidence

2.1 Identify search terms and search strategy

2.2 Look for secondary sources

2.3 Search for primary sources



2.2 Look for secondary sources (prefiltered)

- **Advantages:**

- Comprehensive literature search
- Strict criteria for quality and validity research
- Informative abstract
- Regularly updated

- **Limitations:**

- Not for very focused or rare conditions

- www.nice.org.uk
- www.sign.ac.uk
- www.guideline.gov
- www.cma.ca
- www.nzgg.org.nz
- www.tripdatabase.com
- Medical link websites:
 - Medscape
 - MD Consult
 - *e-medicine*
- Organization websites
- Etc.



Step 2. Track down the best evidence (online)

- The approach for finding evidence
 - 2.1 Identify search terms and search strategy
 - 2.2 Look for secondary sources
 - 2.3 Search for primary sources**



2.3 Search for primary sources

- **Advantages:**

- Comprehensive coverage
- Readily accessible

- **Disadvantages:**

- Large size and complexity
- Wide range of publications

- PubMed
- National Library of Medicine
- Etc.



Steps in EBM process

1. Formulate an answerable clinical question
2. Track down the best evidence
- 3. Critically appraise the evidence**
4. Integrate with clinical expertise and patient concerns



Step 3. Critically appraise the evidence

- 3 considerations in Critical Appraisal:

V = Is the study **valid**?

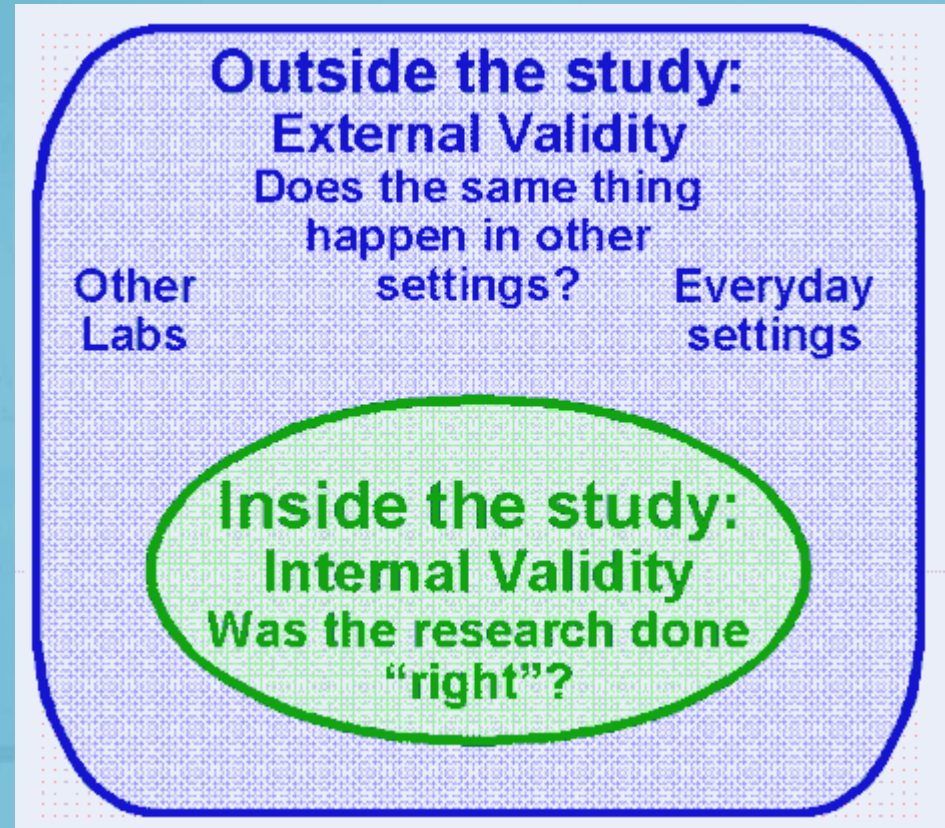
R = What is the **result** and is it important?

A = Can it **apply** to my patients?



Is the study valid?

- Journal
- Authors
- Research questions
- Study design
- Statistical analysis



What's Journal? (V)



AMERICAN ACADEMY
OF OPHTHALMOLOGY®



Small-Incision Lenticule Extraction (SMILE) for the Correction of Myopia with Astigmatism

*Outcomes of the United States Food and Drug
Administration Premarket Approval Clinical Trial*

Jon G. Dishler, MD,¹ Stephen Slade, MD,² Stefanie Seifert, MSc,³ Steven C. Schallhorn, MD^{4,5,6}

Purpose: To present outcomes of the United States Food and Drug Administration premarket approval clinical trial of small-incision lenticule extraction (SMILE) for the correction of myopia and astigmatism.

Design: Prospective, multicenter clinical trial.

Participants: The study included 357 eyes of 357 patients treated with SMILE (50 for myopia and 307 for myopia with astigmatism). Preoperative sphere ranged between -1.00 and -10.00 diopters (D), with manifest spherical equivalent (MSE) of up to -11.50 D and refractive cylinder of up to -3.00 D.

Methods: Participants were followed up for 12 months. Corrected distance visual acuity (CDVA) and uncorrected distance visual acuity (UDVA), stability of the manifest refraction, and vector analysis of refractive cylinder are presented for the 307 eyes treated for myopia with astigmatism. Adverse events (AEs) are presented for all 357 eyes.

Main Outcome Measures: Corrected distance visual acuity, uncorrected distance visual acuity, manifest

procedure was aborted because of intraoperative suction loss. The mean MSE reduced from -5.39 ± 2.30 D at baseline to -0.01 ± 0.24 D at 12 months. Of all eyes, 95.3% were within 0.50 D of emmetropia at 12 months. The percentage of eyes with UDVA of 20/20 or better was 89.0%. No loss of 2 or more lines of CDVA was observed at the 12-month visit. The refractive cylinder reduced from -1.53 ± 0.70 D at baseline to -0.18 ± 0.31 D at 12 months. The mean correction ratio of refractive cylinder was 0.96 ± 0.16 and a slight undercorrection was apparent for higher attempted corrections of astigmatism. Three intraoperative AEs associated with difficult lenticule removal and resultant cap tear occurred, and all resolved without sequelae at postoperative day 1. During the postoperative period, 8 AEs were recorded, but none of them had significant consequences.

Conclusions: Small-incision lenticule extraction for the treatment of myopia and astigmatism was safe and effective, and the reported AEs had no significant impact on visual acuity. Slight undercorrection of refractive cylinder requires further attention. *Ophthalmology* 2020;127:1020-1034 © 2020 by the American Academy of Ophthalmology

See Commentaries on pages 1025

requires further attention

Ophthalmology 2020;127:1020-1034 © 2020 by the American Academy of Ophthalmology



What's Journal? (V)

CLINICAL SCIENCE

Modified Sutureless and Glue-Free Method Versus Conventional Sutures for Conjunctival Autograft Fixation in Primary Pterygium Surgery: A Randomized Controlled Trial

Bin Yan, MD,*† Li Peng, MD,*† Hanhan Peng, MD,*† Shu Zhou, MD,*† and Baihua Chen, MD, PhD*†

Purpose: To compare the advantages and disadvantages of a modified sutureless and glue-free method with those of conventional sutures for conjunctival autograft fixation in pterygium surgery.

Methods: A prospective randomized controlled study was performed on 73 eyes with primary nasal pterygium. After pterygium excision, the bare sclera was covered with a limbal conjunctival autograft, which was fixed using a modified sutureless and glue-free method in group 1 (39 eyes) and sutures in group 2 (34 eyes). The main outcome measures were operative time, autograft stability, postoperative discomfort, autograft thickness, pterygium recurrence, and complications.

Results: The mean operative time was significantly shorter in group 1 (11.9 ± 1.3 minutes) than in group 2 (24.3 ± 6.1 minutes, $P < 0.0001$). On day 2 postsurgery, the average conjunctival autograft thickness was significantly higher in group 1 ($861 \pm 340 \mu\text{m}$) than in group 2 ($577 \pm 287 \mu\text{m}$, $P = 0.034$). Subsequently, conjunctival autograft thickness gradually decreased, with no significant difference between groups after 1 week. There were no significant differences in postoperative discomfort between groups, except for a greater foreign body sensation on day 2 and an itching sensation in 1 week in group 2 compared with group 1. Autograft side displacement occurred in 4 patients (10.3% in group 1; 2 of these 4 developed a granuloma. There was 1 recurrence (2.9%) in group 2.

Conclusions: The modified sutureless and glue-free limbal conjunctival autograft fixation method might be effective and efficient

Key Words: pterygium, conjunctival autograft, sutureless, glue-free (Cornea 2019;38:1351-1357)

Surgery has been the sole effective treatment for pterygium thus far. Despite various surgical approaches, postoperative pterygium recurrence remains problematic.¹ Among these methods, conjunctival autograft transplantation with or without limbal stem cells has become a widely used surgical method for pterygium because it results in a low recurrence rate and fewer complications.^{2,3} Suturing is the most common method to fix autologous conjunctival autografts but can lead to numerous complications.⁴ Moreover, the suture may aggravate inflammation after surgery, leading to recurrence. To alleviate the suture reaction and related complications, shorten operative time, and simplify the operation, fibrin glue, autologous blood, and cauterization have been used to replace sutures for fixation of conjunctival autografts.^{5,6} Of these, fibrin glue is the most common alternative to sutures; it can significantly reduce postoperative reactions and shorten operative time, but has some shortcomings, such as potential risk of blood-borne disease transmission, allergic reactions, and higher cost.^{6,7} In addition, the recurrence rate, conjunctival autograft dislodgement or loss rate, and surgical complications after the use of fibrin glue vary among reports.⁸⁻¹¹ Autologous serum or bleeding in the operative area to fix conjunctival autografts has achieved some successful outcomes¹²⁻¹³; however, this approach also has some

Cornea • Volume 38, Number 11, November 2019

From the *Department of Ophthalmology, The Second Xiangya Hospital of Central South University, Changsha, Hunan, China, and †Hunan Clinical Research Center of Ophthalmic Disease, Changsha, Hunan, China. The authors have no funding or conflicts of interest to disclose. Supplemental digital content is available for this article. Direct URL citations appear in the printed text and are provided in the HTML and PDF versions of this article on the journal's Web site (www.corneajnl.com). Correspondence: Baihua Chen, MD, PhD, Department of Ophthalmology, The Second Xiangya Hospital of Central South University, Changsha, Hunan 410011, China (e-mail: chenbahu2017@csu.edu.cn). Copyright © 2019 Wolters Kluwer Health, Inc. All rights reserved.

Cornea • Volume 38, Number 11, November 2019

www.corneajnl.com | 1351

Copyright © 2019 Wolters Kluwer Health, Inc. Unauthorized reproduction of this article is prohibited.

What's Journal IF? (V)

- IF = Impact factor
- A measure of the frequency with which the average article in a journal has been cited in a particular year or period
- การวัดค่าความถี่ของการอ้างอิงบทความของวารสาร
- ประเมินคุณภาพ เปรียบเทียบ และจัดอันดับวารสาร



Who is/are the authors? (V)

Only 2 authors:

- First author
- Corresponding author
- ถ้าไม่แน่ใจว่าจะเรียกชื่อถูกไหม ก็ไม่ต้องอ่าน (A.Barbara แนะนำ)
- แนะนำพอสังเขปว่า เป็นใคร อยู่ที่ไหน มีความชำนาญทางไหน



What is/are the research questions? (V)

- What question did the study ask?
- PICO in clinical trial/systematic review

P	Patient, Population or Problem What are the characteristics of the patient or population? What is the condition or disease of interest?
I	Intervention or Exposure What do you want to do with this patient (e.g. treat, diagnose, observe)?
C	Comparison What is the alternative to the intervention (e.g. placebo, different drug, surgery)?
O	Outcome What are the relevant outcomes (e.g. morbidity, death, complications)?



What is the Study design? (V)

- Is the study design appropriate to the research question?

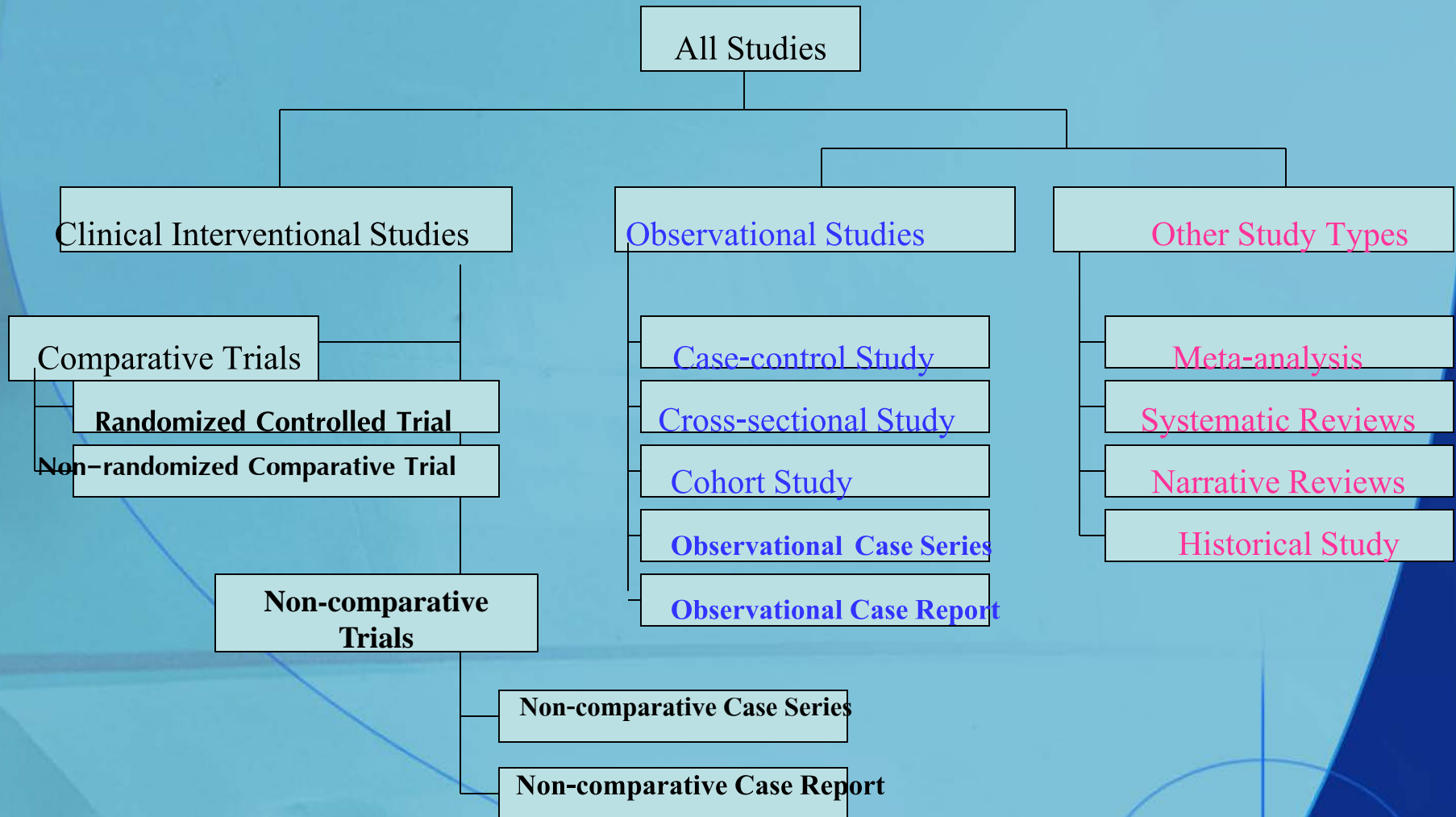


Clinical questions & Study design

- Diagnosis
- Prevalence
- Incidence
- Risk
- Prognosis
- Treatment
- Prevention
- Cause
- Cross-sectional
- Cross-sectional
- Cohort
- Cohort, Case-control
- Cohort
- RCT
- RCT
- Cohort, Case-control

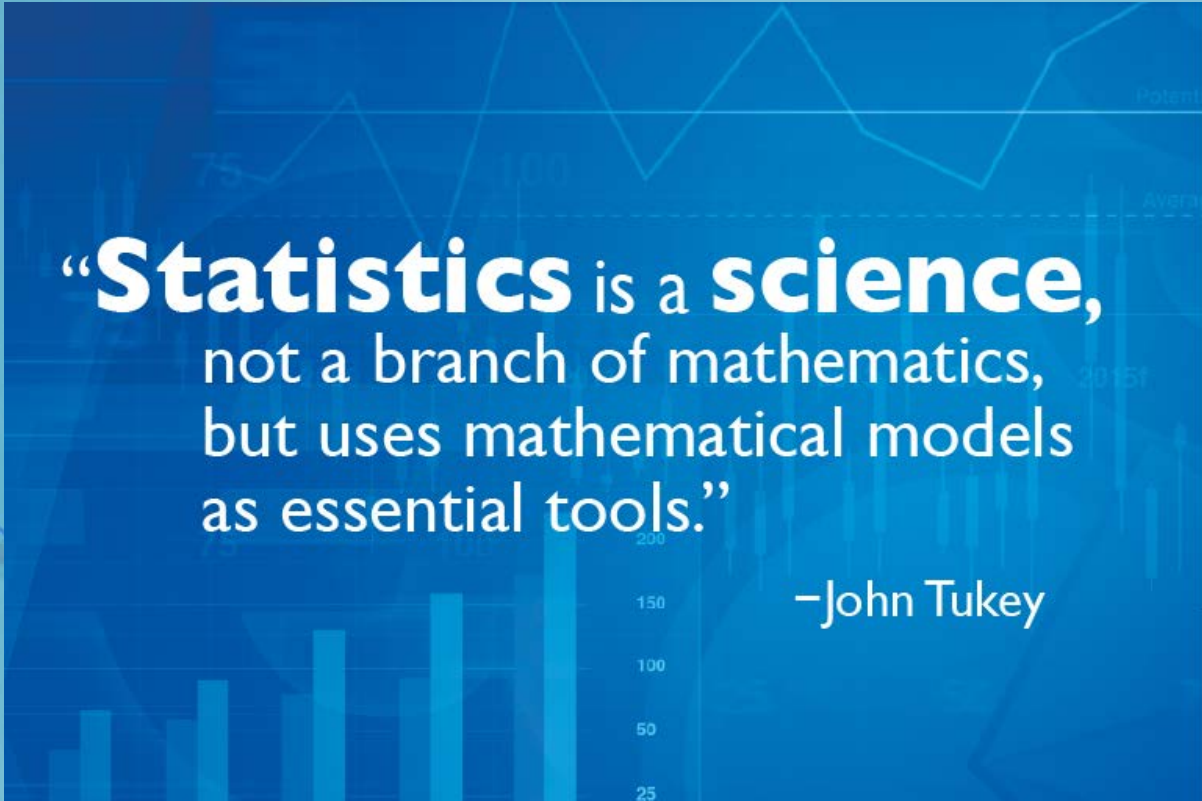


Study Design Scheme in Ophthalmology J



What is/are the Statistical analysis? (V)

- Is the statistical analysis appropriate to the research question?



“Statistics is a **science**,
not a branch of mathematics,
but uses mathematical models
as essential tools.”

–John Tukey



What is the result and is it important? (R)

- Does the result answer to the research question?



Can it apply to my patients? (A)

- Make your own opinion to this article and explain the reason



Critical Appraisal Checklist Tools

- CASP (Critical Appraisal Skill Program)
- BMJ Best Practice
- JBI (Joanna Briggs Institute)
- CEBM (Center for Evidence-Based Medicine, Oxford University)
- Etc.
- Choose the appropriate study design!!




Example: Simplifying critical appraisal RCT

The two mnemonics method

- What question did the study address?
 - PICO

- Were methods valid?
 - RAMMbo

- CEbm (center for evidence based medicine), Oxford University

		Author:		Ref:	
www.cebm.net		Description		Numbers	
Question	P Patients				
	I Intervention				
	C Comparator				
	O Outcomes	1			CER (%)
2					
Appraisal	R Randomized				
	A Ascertainment				
	M Measures				
Outcomes	RDifference	CER – EER			
	RRR	RD/CER			
	NNT	1/RD			

Clinical Bottom-line:

Further Actions:

Use **RAMMbo** to check validity

Representative

- Who did the subjects represent?

Allocation

- Was the assignment to treatments randomised?
- Were the groups similar at the trial's start?

Maintenance

- Were the groups treated equally?
- Were outcomes ascertained & analysed for most patients?

Measurements **blinded** OR **objective**

- Were patients and clinicians “**blinded**” to treatment?
OR
- Were measurements **objective** & standardised?

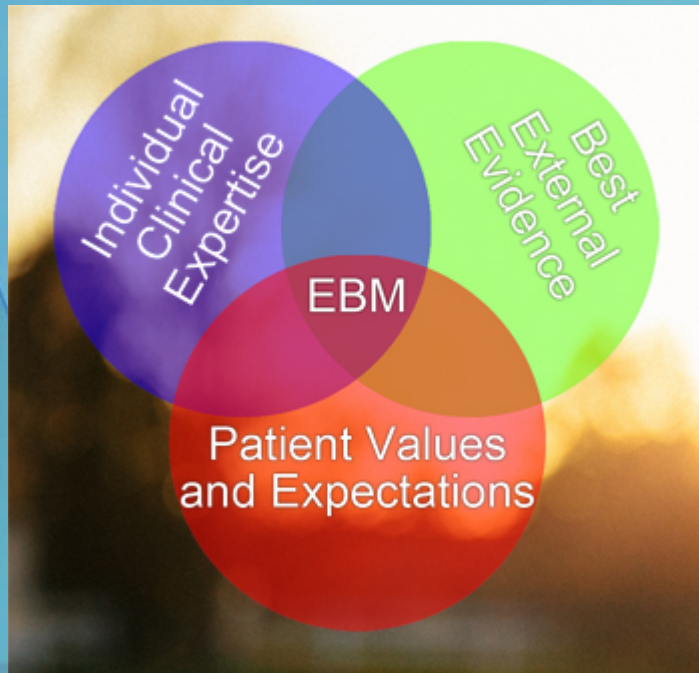


Steps in EBM process

1. Formulate an answerable clinical question
2. Track down the best evidence
3. Critically appraise the evidence
- 4. Integrate with clinical expertise and patient concerns**



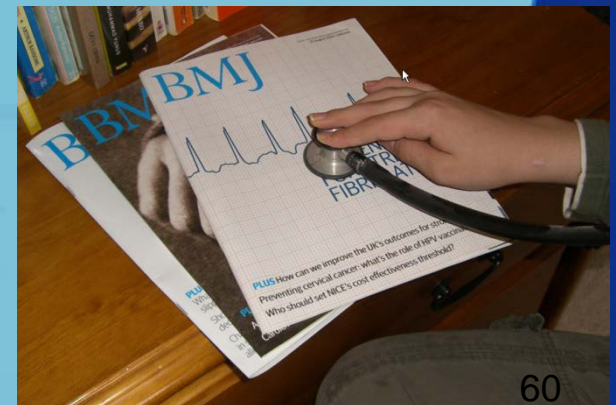
Step 4. Integrate with clinical expertise and patient concerns



The 5 steps of EBM

1. Formulate an answerable question
2. Track down the best evidence
3. Critically appraise the evidence for validity, clinical relevance and applicability
4. Individualize, based clinical expertise and patient concerns
5. Evaluate your own performance

- CEBM (center for evidence based medicine), Oxford University



Life long learning....

- *"It is astonishing with how little reading a doctor can practice medicine, but it is not astonishing how badly he may do it."*

Sir William Osler 1849-1920



Question during reading articles

- Is it of interested?
- Why was it done?
- How was it done?
- What has it found?
- What are the implications?
- What else of interest?



Question during reading articles

- Is it of interested?
 - Title, Abstract
- Why was it done?
 - Introduction
- How was it done?
 - Methods
- What has it found?
 - Results
- What are the implications?
 - Discussion, Abstract
- What else of interest?
 - Discussion



Sources and further study

- Guyatt G, et al. (Eds). *Users 'Guides to the Medical Literature: Essential of Evidence-Based Clinical Practice, 3rd Ed.* New York: McGraw-Hill Education-JAMA Network, 2015.
- Kaura A. *Evidence-Based Medicine: Reading and Writing Medical Papers* (Crash Course Series). Philadelphia: Mosby-Elsevier, 2012.
- Straus S, Richardson WS, Glasziou P, Haynes RB. *Evidence-Based Medicine. How to Practice and Teach EBM. 3rd Ed.* New York: Elsevier, 2005.



ลำดับการดำเนินรายการ Journal Club ภาควิชาจักษุวิทยา คณะแพทยศาสตร์ มหาวิทยาลัยเชียงใหม่

1. Presenter ส่ง pdf ของ journal ให้อาจารย์ และ resident ทุกคน อย่างน้อย 4-5 สัปดาห์
2. Presenter ส่ง powerpoint ล่วงหน้าให้ English consultant ทาง email อย่างน้อย 2-3 สัปดาห์
3. 7:30 น. Moderator แนะนำ presenter และหัวข้อเรื่อง
4. Presenter นำเสนอ อาจท้าวความ background knowledge ได้เล็กน้อย และเริ่มนำเสนอเนื้อหา
5. Moderator แนะนำ Critical appraisers ทั้งสอง
6. Critical appraisers วิจารณ์ตามหลักการ โดยการแนะนำ authors ให้กล่าวเฉพาะ first author กับ corresponding author

และใช้ critical appraisal check list ที่เหมาะสม



7. Moderator ถาม audience ว่ามีคำถามหรือไม่ ถ้าไม่มี ให้ระบุชื่อถามเป็นรายบุคคล
8. English consultants วิจารณ์
9. อาจารย์ comment เรื่อง statistical issue
10. อาจารย์ที่เข้าร่วม comment ส่วนต่าง ๆ
11. อาจารย์ consultant ของ journal ประจำวันนั้น comment และสรุปเรื่อง journal
12. Moderator กล่าวปิด journal session และส่งต่อให้ English consultants
13. English consultants ทำ workshop เสริมความรู้และทักษะภาษาอังกฤษ ให้ resident และอาจารย์

ปล. ข้อ 1 และ 2 อาจปรับน้อยกว่านี้ในกรณี มกราคม กรกฎาคมที่มีการจัดตารางใหม่ จึงอาจมีเวลาไม่นานพอ

กรรมการฝึกอบรม residency training & คณะกรรมการ ปับณจิตชั้นสูง

15 พฤศจิกายน 2560





Thank you for your attention

Any comm questions?



S. Ausayakhun, MD, MHSc.