



# EBM

Effect of additional iPACK technique  
on postoperative pain in total knee  
arthroplasty

高雄醫學大學附設醫院  
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# 臨床情境

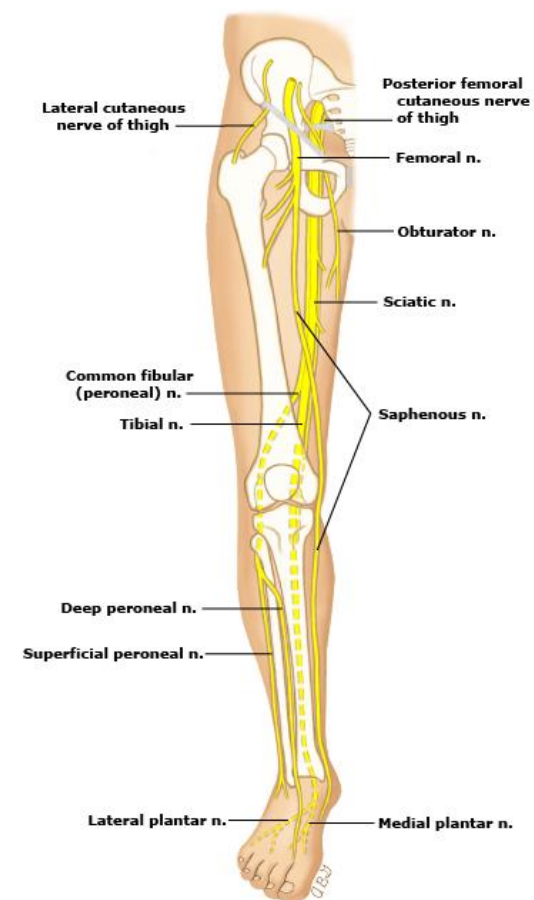
- 這位60歲女性是一位農業工人，她需要負重和長時間站立，以維持她的工作。此次來到醫院接受全膝關節置換術。她已經遭受膝關節疼痛多年，對於常常無法完成日常生活中的基本任務感到沮喪和無助。她描述了長期運動和體力訓練對於減輕疼痛的無效性，並且說她已經試過諸如物理治療和抗炎藥等非手術治療，但都沒有效果。
- 醫生對她進行了一些測試和評估，確定了她需要接受全膝關節置換術。手術過程中，醫生使用人造膝關節代替了已受損的膝關節，使她的膝關節得以重新恢復功能。
- 她對於術後疼痛非常在意，因為她希望能夠盡快回去工作。麻醉科醫師在手術前向她說明了使用神經阻斷術的建議，以便減少手術後的疼痛。

# 病人關心的問題

1. 術後傷口疼痛情形
2. 能否術後盡快下床活動

# 背景知識(Background knowledge)

- Peripheral Nerve block application in TKA

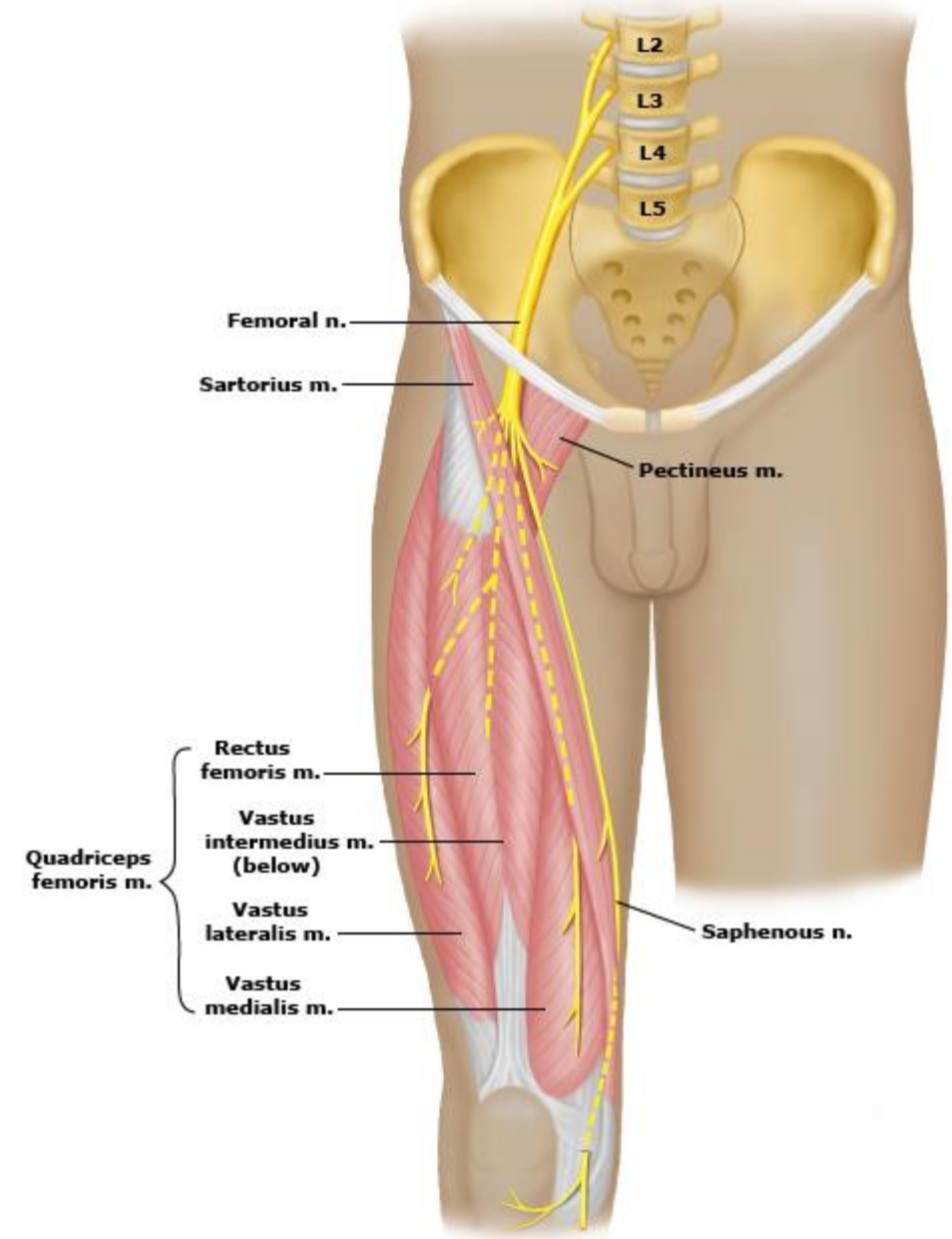


# Adductor canal block

- The ACB involves block of the **saphenous nerve (sensory only)**, the nerve to the vastus medialis, and possibly the deep branch of the obturator nerve.
- Both single injection and continuous ACBs may be used for analgesia after TKA.
- ACBs result in less quadriceps weakness than femoral nerve blocks, but have not been shown to reduce the risk of falls.

# Femoral nerve block

- The femoral nerve block anesthetizes **all of the sensory innervation to the knee** except for branches of the sciatic and obturator nerves, including sensorimotor nerves to the vastus medialis, vastus intermedius and vastus lateralis, and the sensory saphenous nerve
- Femoral block may be combined with a PAI that focuses on the posterior capsule of the knee; however, total cumulative dose of LA should be monitored.



# Sciatic nerve block

- Sciatic nerve block combined with femoral nerve block provides excellent pain control after TKA, but is limited by associated motor weakness (foot drop), which may mask surgery-related peroneal nerve injury.
- Sciatic nerve block is associated with a longer duration of anesthesia than other single injection blocks (>24 hours) and postoperative neuropathy, particularly in patients with small vessel disease.

## Interspace between popliteal artery and posterior capsule of the knee (IPACK) block

- The IPACK block is designed to block the small sensory branches of the sciatic nerve that travel in this space without affecting motor components.
- The IPACK block provides analgesia for the posterior portion of the knee only, and would likely be ineffective alone for postoperative analgesia; thus it is often performed along with an ACB in a multimodal analgesic pathway.

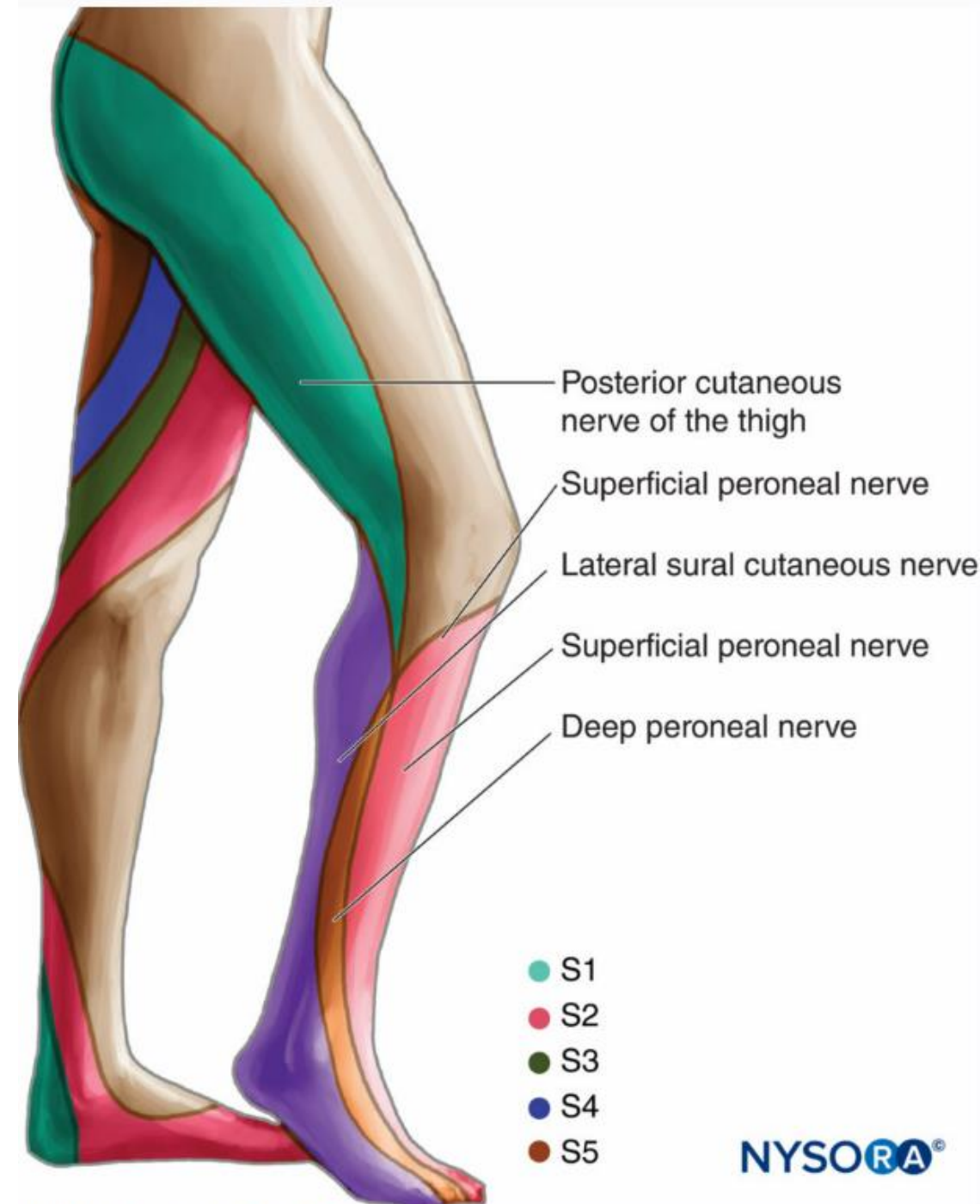


FIGURE 6. Sciatic nerve. Cutaneous innervation.

Ask

Acquire

Appraisal

Apply

P	接受全膝關節置換術的60歲女性農業工人
I	接受ACB + IPACK神經阻斷術
C	ACB無IPACK神經阻斷術
O	術後疼痛程度、康復時間

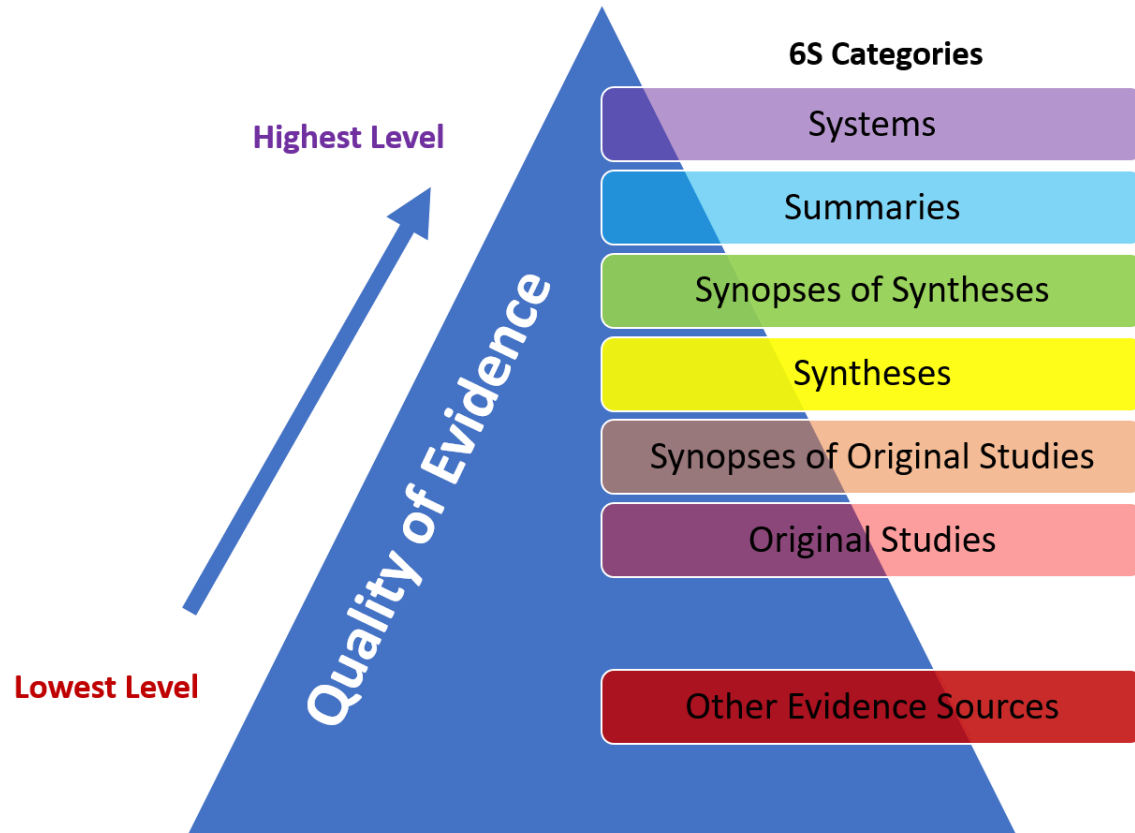
類型	➔	治療性	診斷性	預後性	傷害性
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	Keywords	MeSH terms	中文搜尋文字
<b>P</b>	Total knee arthroplasty	Knee arthroplasty/ Arthroplasty, Replacement, Knee/	全膝關節置換術
<b>I</b>	IPACK/adductor canal block	Nerve Block/Popliteal Artery /regional anesthesia	周邊神經阻斷術
<b>C</b>	adductor canal block	Peripheral nerve block;	內收肌管阻斷
<b>O</b>	Knee pain, Knee rehabilitation, Knee function	Postoperative pain/Pain, Postoperative	術後疼痛

What we ask ? 找出合適的關鍵字和 intervention



# Ladder about searching policy



Modified from DiCenso, Bayley, & Haynes, 2009  
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**Secondary  
pre-appraised research**



**Primary original research**





Title Abstract Keyword ▼

("Total knee arthroplasty") AND ("iPACK") AND ("adductor canal block") AND ("Postoperative pain")

(Word variations have been searched)



Search limits

Send to search manager

Run search

Clear all

## Filter your results

Year

Year first published

2023

Cochrane Reviews  
0Cochrane Protocols  
0Trials  
39Editorials  
0Special Collections  
0Clinical Answers  
0More  
▼⚠ For COVID-19 related studies, please also see the [Cochrane COVID-19 Study Register](#)

Year: Custom year range ✕

**37** Trials matching ("Total knee arthroplasty") AND ("iPACK") AND ("adductor canal block") AND ("Postoperative pain") in Title Abstract Keyword - (Word variations have been searched)



("Total knee arthroplasty" OR "Knee joint replacement") AND ("iPACK" ) AND



Search

[Advanced](#) [Create alert](#) [Create RSS](#)

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Save

Email

Send to

Sorted by: Most recent ↑

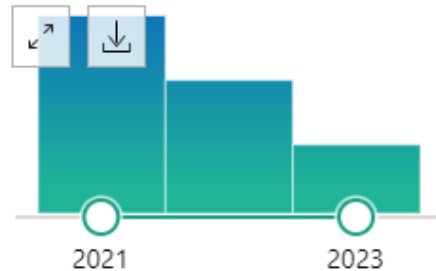
Display options ⚙️

MY NCBI FILTERS

5 results

⏪ < Page 1 of 1 > ⏩

RESULTS BY YEAR



RESULTS BY IMPACT FACTOR

Filters applied: Meta-Analysis. [Clear all](#)



1

The analgesic efficacy of **iPACK** after **knee** surgery: A systematic review and meta-analysis with trial sequential analysis.

Cite

Albrecht E, Wegrzyn J, Dabetic A, El-Boghdadly K.

Share

*J Clin Anesth* (IF: 9.45; Q1). 2021 Sep;72:110305. doi: 10.1016/j.jclinane.2021.110305. Epub 2021 Apr 28.

PMID: 33930796 [Free article.](#)

STUDY OBJECTIVE: The novel infiltration between the popliteal artery and the capsule of the posterior **knee (iPACK)** has been described to relieve posterior **knee pain** after **knee** surgery. ...Based on these results. there is currently limited eviden ... >>>



Embase

4 results for search #2 [Set email alert](#) [Set RSS feed](#) [Search details](#) [Index miner](#)

<input type="checkbox"/> Results	<a href="#">View</a>   <a href="#">Export</a>   <a href="#">Email</a>   <a href="#">Add to Clipboard</a>	1 — 4
<input type="checkbox"/> 1	<p><b>iPACK block</b> (local anesthetic infiltration of the interspace between the popliteal artery and the posterior knee capsule) added to the <b>adductor canal</b> blocks versus the <b>adductor canal</b> blocks in the pain management after <b>total knee arthroplasty</b>: a systematic review and meta-analysis</p> <p>Guo J., Hou M., Shi G., Bai N., Huo M. <i>Journal of orthopaedic surgery and research</i> 2022 17:1 (387-)</p> <p>MEDLINE <a href="#">Abstract</a> <a href="#">Index Terms</a> <a href="#">View Full Text</a> <a href="#">KMU Library</a></p> <p><a href="#">Similar records &gt;</a></p>	
<input type="checkbox"/> 2	<p>The analgesic efficacy of <b>iPACK</b> after knee surgery: A systematic review and meta-analysis with trial sequential analysis</p> <p>Albrecht E., Wegrzyn J., Dabetic A., El-Boghdadly K. <i>Journal of Clinical Anesthesia</i> 2021 72 Article Number 110305 Cited by: 8</p> <p>Embase MEDLINE <a href="#">Abstract</a> <a href="#">Index Terms</a> <a href="#">View Full Text</a> <a href="#">KMU Library</a></p> <p><a href="#">Similar records &gt;</a></p>	
<input type="checkbox"/> 3	<p>Optimal regional anaesthesia-analgesia for knee surgery: Current trends &amp; future perspectives</p> <p>Delbos A. <i>Signa Vitae</i> 2021 17:SUPPL 1 (S61-S62)</p> <p>Embase <a href="#">Abstract</a> <a href="#">Index Terms</a> <a href="#">View Full Text</a> <a href="#">KMU Library</a></p> <p><a href="#">Similar records &gt;</a></p>	
<input type="checkbox"/> 4	<p>Does the addition of <b>iPACK</b> to <b>adductor canal block</b> in the presence or absence of periarticular local anesthetic infiltration improve analgesic and functional outcomes following <b>total knee arthroplasty</b>? A systematic review and meta-analysis</p> <p>Hussain N., Brull R., Sheehy B., Dasu M., Weaver T., Abdallah F.W. <i>Regional Anesthesia and Pain Medicine</i> 2021 46:8 (713-721) Cited by: 26</p> <p>Embase MEDLINE <a href="#">Abstract</a> <a href="#">Index Terms</a> <a href="#">View Full Text</a> <a href="#">KMU Library</a></p> <p><a href="#">Similar records &gt;</a></p>	

查詢 ((膝關節置換術 and 周邊神經阻斷 and 術後疼痛)) = 全文檢索

篇名.關鍵字.摘要 作者 刊名 起始年 結束年 檢索結果再查詢

每頁 10筆

共 1 筆， 1 - 1 筆

共 1 頁

書目匯出  加入收藏  加入購物車

相關程度最高

- 1 **膝關節置換術後接受股神經阻斷術病人的疼痛及膝關節活動度之成效分析**  
顏儀瑾(I-Chin YEN)；林佑樺(Yu-Hua LIN)；林楷城(Kai-Cheng LIN)；劉憶慧(Yi-Hui LIU)；  
護理雜誌 69卷2期 ( 2022/04 ) , 32-43  
股神經阻斷；全膝關節置換術；疼痛；膝關節活動度；femoral nerve block；total knee replacement  
； pain；knee mobility  
10.6224/JN.202204\_69(2).06  
預覽摘要 | 參考文獻 (38)

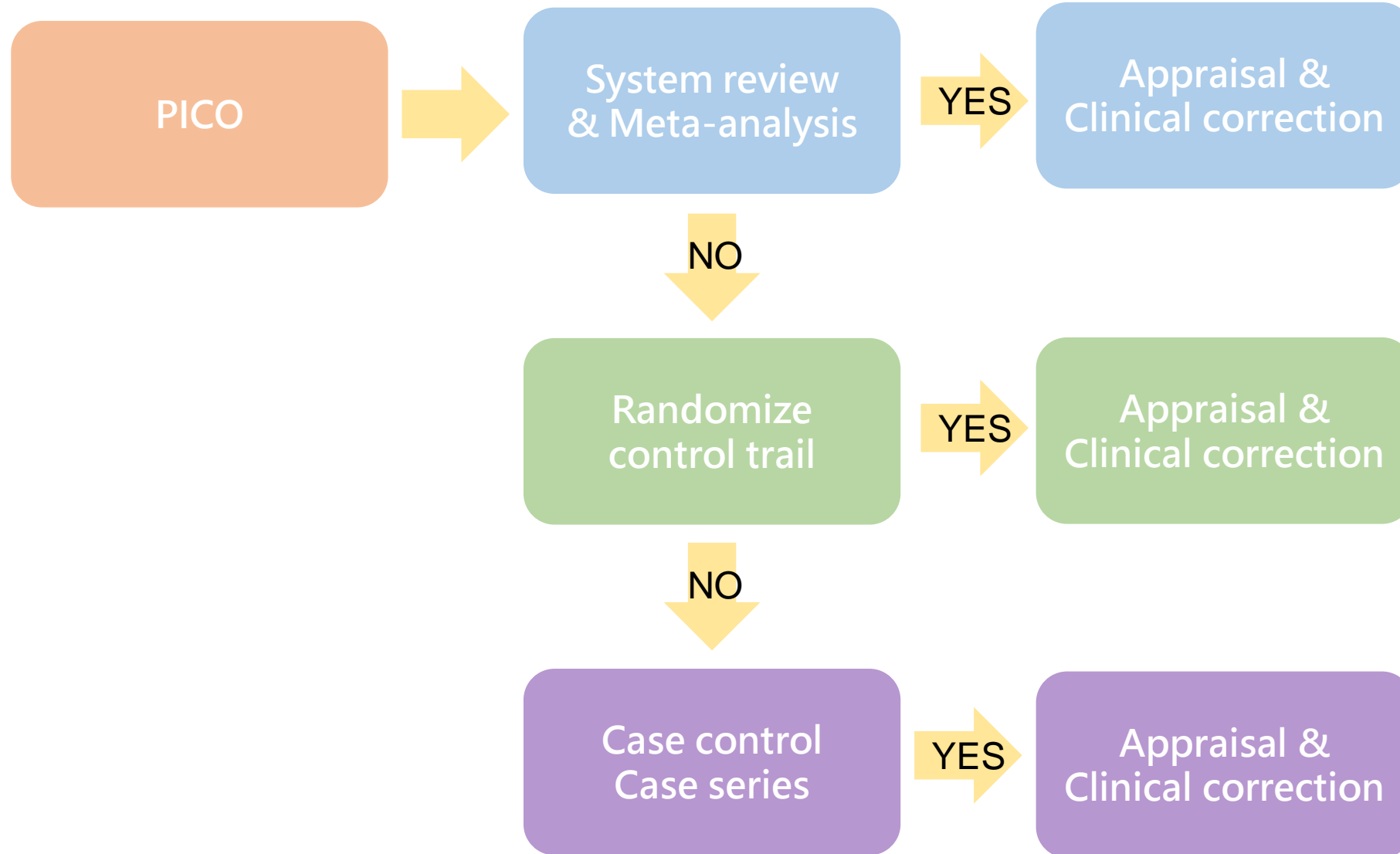
Ask

Acquire

Appraisal

Apply

# 搜尋流程



Ask

Acquire

Appraisal

Apply



Embase



整合搜尋結果

輸入『P』、『I』及適當同義詞，並搭配各資料庫限定或 filter 功能

n=0

n=5

n=4

n=0

選擇『5年內』之文章

n=0

n=5

n=4

n=0

選擇『符合臨床問題』之文章

n=0

n=4

n=2

n=0

Guo et al.  
*Journal of Orthopaedic Surgery and Research* (2022) 17:387  
<https://doi.org/10.1186/s13018-022-03272-5>

Journal of Orthopaedic  
Surgery and Research

**SYSTEMATIC REVIEW****Open Access**

# iPACK block (local anesthetic infiltration of the interspace between the popliteal artery and the posterior knee capsule) added to the adductor canal blocks versus the adductor canal blocks in the pain management after total knee arthroplasty: a systematic review and meta-analysis

Jiao Guo<sup>1</sup>, Minna Hou<sup>1</sup>, Gaixia Shi<sup>2</sup>, Ning Bai<sup>1</sup> and Miao Huo<sup>1\*</sup>

## Conclusion:

- The addition of iPACK lowers postoperative VAS scores, cumulative morphine consumption, and hospital stays
- The addition of iPACK improves postoperative patients' activity performance without extra side effects.
- iPACK combined with ACB proves to be a suitable pain management technique after TKA.



1. Did the review address a clearly focused question?

Yes	<input type="checkbox"/>
Can't Tell	<input type="checkbox"/>
No	<input type="checkbox"/>

HINT: An issue can be 'focused' In terms of

- the population studied
- the intervention given
- the outcome considered

P	TKA patients
I	ACB + iPACK
C	ACB only
O	Postoperative pain, postoperative ROM and walking distance

**YES**

2. Did the authors look for the right type of papers?

Yes	<input type="checkbox"/>
Can't Tell	<input type="checkbox"/>
No	<input type="checkbox"/>

HINT: 'The best sort of studies' would

- address the review's question
- have an appropriate study design (usually RCTs for papers evaluating interventions)

- 本篇文章優先收納證據等級較高的RCT來進行分析

**YES**

3. Do you think all the important, relevant studies were included?

Yes	<input type="checkbox"/>
Can't Tell	<input type="checkbox"/>
No	<input type="checkbox"/>

HINT: Look for

- which bibliographic databases were used
- follow up from reference lists
- personal contact with experts
- unpublished as well as published studies
- non-English language studies

- 搜尋範圍包含中英文資料庫
- 檢索關鍵詞完整，包含同義詞及Mesh terms
- 無漏斗圖，無法判斷出版誤差

**Can't tell**

4. Did the review's authors do enough to assess quality of the included studies?

Yes	<input type="checkbox"/>
Can't Tell	<input type="checkbox"/>
No	<input type="checkbox"/>

HINT: The authors need to consider the rigour of the studies they have identified. Lack of rigour may affect the studies' results ("All that glitters is not gold" Merchant of Venice – Act II Scene 7)

- 以RoB來評讀文章
- 且有兩位reviewer進行評讀

**YES**

5. If the results of the review have been combined, was it reasonable to do so?

Yes	<input type="checkbox"/>
Can't Tell	<input type="checkbox"/>
No	<input type="checkbox"/>

HINT: Consider whether

- results were similar from study to study
- results of all the included studies are clearly displayed
- results of different studies are similar
- reasons for any variations in results are discussed

- 以 $I^2$ 及 $\chi^2$  tests 評估研究異質性 ( $I^2 > 65\%$ , significant)
- 當 $I^2 > 65\%$ ，額外使用GOSH analysis及subgroup analysis分析異質性原因
- 但是初始分析尤其VAS score， $I^2$ 基本上都 $> 65\%$

**No**

## 6. What are the overall results of the review?

HINT: Consider

- If you are clear about the review's 'bottom line' results
- what these are (numerically if appropriate)
- how were the results expressed (NNT, odds ratio etc.)

- There are significant differences between the two groups in VAS scores at rest and with activity. VAS scores at rest: SMD=-0.75, 95%CI [-0.96, -0.53],  $I^2$  : 94%,  $P < 0.00001$ . VAS scores with activity: SMD=-0.61, 95%CI [-0.79, -0.43],  $I^2$  : 76%,  $P < 0.00001$ .
- The finding of postoperative walk distance favors the group of ACB + iPACK (SMD: 0.28, 95%CI: [0.15, 0.41],  $P < 0.00001$ ,  $I^2$  : 2%)

**YES**

## 7. How precise are the results?

HINT: Look at the confidence intervals, if given

- 文中未提及檢定力及個案數的關聯性
- VAS at rest CI: [-0.96, -0.53], VAS with activity CI: [-0.79, -0.43]  
精確度並無太高，但兩者P值皆 $<0.01$ 具顯著差異
- 術後步行距離 CI為[0.15, 0.41],  $P < 0.00001$ ,  $I^2: 2\%$ 顯示較佳的精確性

**Can't tell**

8. Can the results be applied to the local population?

Yes	<input type="checkbox"/>
Can't Tell	<input type="checkbox"/>
No	<input type="checkbox"/>

- HINT: Consider whether
- the patients covered by the review could be sufficiently different to your population to cause concern
  - your local setting is likely to differ much from that of the review

- 文中進行subgroup analysis分析異質性時，有觀察到年齡<65歲、亞洲女性及進行GA的病人對於ACB + iPACK有較低的VAS score

**YES**



9. Were all important outcomes considered?

Yes	<input type="checkbox"/>
Can't Tell	<input type="checkbox"/>
No	<input type="checkbox"/>

- HINT: Consider whether
- there is other information you would like to have seen

- 結果收納了術後疼痛指標(VAS score, cumulative morphine consumption)、術後功能評估(knee ROM, walking distance, postoperative quadriceps muscle strength)

YES

10. Are the benefits worth the harms and costs?

Yes	<input type="checkbox"/>
Can't Tell	<input type="checkbox"/>
No	<input type="checkbox"/>

HINT: Consider

- even if this is not addressed by the review, what do **you** think?

- 無提到成本效益評估

**No**

Ask

Acquire

Appraisal

Apply

	本篇研究	我們的患者	
是否符合 PICO	接受TKA的病人，術中使用神經阻斷術 (ACB ± iPACK)	60歲女性接受TKA，術中使用神經阻斷術(ACB + iPACK)	○
納入/排除條件			
研究年齡	>65歲佔30%	60歲	○
研究種族	亞洲人/歐洲人	亞洲人	○
其他特徵	GA佔65%	-	○

<b>簡介疾病</b>	陳小姐您好，神經阻斷術能緩解您術後的疼痛感及加速功能的恢復。
<b>比較選項</b>	在原本自費的神經阻斷術中，除了前側的部份，我們額外對膝蓋後側進行更多的神經阻斷，在收費上並無差異。
<b>了解偏好</b>	我了解您想盡快恢復膝蓋功能以及對術後疼痛的害怕。
<b>衡量優缺點</b>	藉由這次的額外治療，對於術後的疼痛緩解及功能恢復都有顯著差異；考量神經阻斷術之相關併發症。
<b>共同決策</b>	我們建議您在接受手術前，接受ACB + iPACK的治療。您可以跟家人討論後再向我們回復最後的決定。

# Thank you for listening

