Tips for Searching the Medical Literature
Part 1: Searching for Clinical Questions

NEUROSURGERY MEETING
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2nd May 2019
Aim: To provide practical tips for searching:
Specifically:

- Systematically search for **clinical questions (EBS)** and **systematic reviews** using question development, search strategies, keywords & subject headings, Boolean operators, wildcards & limits
- Use advanced search strategies: adjacency operators, sub-headings, field searching, NOT operator
- Use hand searching and cited references for additional studies
- Use PRISMA guidelines to prepare systematic reviews
- Incorporate grey literature, saved searches & alerts into systematic review methodology
- Manage search results using EndNote
Pre-requisite knowledge and skills

IT IS ASSUMED AUDIENCE HAVE SOME EXPERIENCE IN:

- Navigating the Library website to locate resources
- Searching medical databases such as PubMed, Medline or Scopus
- Using basic database search skills including developing questions using PICO, searching with keywords and subject headings (Ovid Medline), combining searches in Medline and adding limits
- Exporting searches to EndNote
- Presenting an EBS case at the Thursday neurosurgery meetings.
What types of searches? What types of resources?

<table>
<thead>
<tr>
<th>Search Type</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Background</td>
<td>Books, UpToDate, DynaMed Plus (evidence summaries)</td>
</tr>
<tr>
<td>Point-of-care</td>
<td>UpToDate, DynaMed Plus, guidelines</td>
</tr>
<tr>
<td>Case report</td>
<td>Medline (or PubMed), Embase, Scopus</td>
</tr>
<tr>
<td>EBS</td>
<td>Medline, Embase, Cochrane, hand searching</td>
</tr>
<tr>
<td>Literature review</td>
<td>Medline, Scopus, PubMed, hand searching</td>
</tr>
<tr>
<td>Systematic review</td>
<td>2+ databases, grey literature, hand searching, Google Scholar</td>
</tr>
</tbody>
</table>

Links to Library resources:
- [http://libguides.mq.edu.au/medicinequicklinks](http://libguides.mq.edu.au/medicinequicklinks)
- [http://libguides.mq.edu.au/neurosurgery](http://libguides.mq.edu.au/neurosurgery)
General Search Tips

SENSITIVITY OR SPECIFICITY?

For most searches, start **broadly** to capture all of the literature (using subject headings and keywords), then focus the search (with additional terms, field searching, filters etc) to increase relevance.

**If you start with a very specific search you may miss some important studies.**
General Search Tips

HOW TO INCREASE THE NUMBER SEARCH RESULTS

If your search is too narrow (not enough results)

• Add **synonyms** and link with **OR** – *brain OR cerebral OR intracranial*
• Use **Explode** option with subject headings in Medline & Embase (includes narrower subject headings as well)
• Use **wildcards** to expand search endings and spelling variations:

**Ovid:**

*Neuropath*$ (neuropathy, neuropathies, neuropathic). Can also use *

$h?emorrhage$ (haemorrhage, hemorrhage)

**Scopus:**

* replaces any number of characters, *toxi* will search for toxin, *toxic, toxicity, toxicology*, and so on

*h*ematoma will retrieve *hematoma* and *haematoma*
Too many results?

NARROW YOUR SEARCH BY:

• Adding a term with **AND** (eg: peroneal neuropathies/ **AND** foot drop)

• Use **adjancy operators: adj** (Ovid) to specify how far apart 2 words must be:

  *Arteriovenous malformation adj3 motor cortex* (each term must be within 3 words of the other term, eg: arteriovenous malformation in the motor cortex.

• Specify where keywords must be by using **field search commands**:

  *(stroke).ti,ab.*  Searches for stroke in the title and abstract of the articles.

  Does not search as a general keyword

  *Surgery.ti,ab.*  Searches for the term surgery in the title and abstract; or surgery.ti. (title only)

• **Add limits** (date, publication type etc)

• Use Ovid **search filters** ([https://hiru.mcmaster.ca/hiru/HIRU_Hedges_MEDLINE_Strategies.aspx](https://hiru.mcmaster.ca/hiru/HIRU_Hedges_MEDLINE_Strategies.aspx) )
Searching for EBS. The EBS process

BACKGROUND TO CLINICAL CASE

RATIONALE FOR QUESTION

PICO AND SEARCHABLE QUESTION

DATABASE SELECTION – SEARCH STRATEGIES

MANAGE RESULTS – ENDNOTE

DOCUMENT PROCESS – PRISMA FLOW DIAGRAM

SUMMARISE AND EVALUATE RESULTS. (TABLE)

CONCLUSION – ANSWER QUESTION

POWERPOINT PRESENTATIONS MUST INCLUDE:
Question Development – not just PICO

STUDY TYPES AND QUESTION FORMATS

**PICO** (Studies of effects and economics)
- P Population
- I Intervention
- C Comparator
- O Outcome

**PEO** (Case series)
- P Population
- E Exposure
- O Outcome

**PICo** (Qualitative studies)
- P Population
- I Phenomena of Interest
- C Context

**PO** (eg: natural history)
- P Population
- O Outcome

https://libguides.murdoch.edu.au/systematic/PICO
**Scenario**
44 YOM with 1 week of severe right sided radiculopathy after lifting and 3/5 weakness ankle dorsiflexion with foot drop.
CT shows L4/L5 posterolateral disc protrusion

**P** – adults with foot drop secondary to degenerative lumbar disc disease
**I** – Decompressive surgery
**C** – Nil
**O** - Improvement of neurological function

**Question:** What is the outcome of decompressive surgery for patients with foot drop secondary to Degenerative lumbar spondylosis?
Question development

INCLUSION & EXCLUSION CRITERIA

**Intervention (treatment) study design** – RCT or prospective case series (study type)

**Include:**
- RCTs and case series (> 20 participants)
- Foot drop due to lumbar disc disease

**Exclude**
- Case Reports, literature reviews.
- Foot drop from other surgical and medical causes
Which databases?

PLAN THE SEARCH

**Databases:**
- Medline
- Embase
- Scopus

- **? Hand searching** – manually checking reference lists and citing papers of relevant papers found in the search.
  Also browsing key journals and searching for publications of important authors.
- Scopus bibliographies, citing papers
SEARCH USING MESH (SUBJECT HEADINGS) AND MAPPING. SEARCH FOR EACH PART OF PICO SEPARATELY THEN COMBINE WITH OPERATORS.
CHECK SCOPE NOTE FOR HISTORY, SYNONYMS AND RELATED TERMS
SCOPE NOTE: DEFINITION, PREVIOUS INDEXING, RELATED, USED FOR (SYNONYMS)

SCOPE: Disease involving the common PERONEAL NERVE or its branches, the deep and superficial peroneal nerves. Lesions of the deep peroneal nerve are associated with PARALYSIS of dorsiflexion of result in weakness or paralysis of the peroneal muscles (which extert the foot) and loss of sensation over the dorsal and lateral surface of the leg. Traumatic injury to the common peroneal nerve near the head.

YEAR of ENTRY: 2000


REFERENCES:
See Related:
- LEG INJURIES

Used For:
- common peroneal nerve entrapment
- common peroneal neuropathies
- common peroneal neuropathy
- deep peroneal neuropathies
- deep peroneal neuropathy
- entrapment, peroneal nerve
- external popliteal neuropathies
- external popliteal neuropathy
- fibular nerve disease
- fibular nerve diseases
- fibular neuropathy
SUB-HEADINGS – CLICK ‘CONTINUE’ TO “INCLUDE ALL SUBHEADINGS”
**Ovid Medline**

**UNCLICK MAPPING. ADD KEYWORD TERMS – LINK WITH ‘OR’.

<table>
<thead>
<tr>
<th>Searches</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Peroneal Neuropathies</td>
<td>611</td>
</tr>
</tbody>
</table>

**Basic Search | Find Citation | Search Tools | Search Fields | Advanced Search | Multi-Field Search**

**Enter keyword or phrase**

- *(Keyword) or Author or Title or Journal)*

- **Foot drop or footdrop or drop foot**

**Search**

- **Map Term to Subject Heading**

- **Limits: (ISO 3)**
  - Abstracts
  - Full Text
  - Core Clinical Journals (AIM)

- **Publication Year: -**

**Include Multimedia**

- **English Language**
- **Humans**
- **Pharmacologic Actions**
### Combine Mesh Term and Keywords with ‘OR’.

**Synonym Building**

<table>
<thead>
<tr>
<th>#</th>
<th>Searches</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Peripheral Neuropathies/</td>
<td>611</td>
</tr>
<tr>
<td>2</td>
<td>(foot drop or foot drop or drop foot).mp.</td>
<td>1542</td>
</tr>
<tr>
<td>3</td>
<td>1 or 2</td>
<td>1992</td>
</tr>
</tbody>
</table>

- **Save**
- **Remove**
- **Combine with:** [AND][OR]
SEARCH FOR NEXT CONCEPT USING MAPPING –REMEMBER TO TICK THE BOX
CHOOSE RELEVANT MESH TERMS FOR ‘LUMBAR DISC DISEASE’

Combine with ‘OR’

**DO NOT** add other terms that may be associated with the population or P (PICO) (eg: male, adult) as these are NOT related to the terms for ‘lumbar disc disease’ and will broaden the search too much.
Ovid Medline – start broad

SEARCH FOR MORE TERMS
.mp. Stands for ‘multi-purpose’ and means keyword. Fields vary by database but usually include Title, Original Title, Abstract, and Subject Heading.
COMBINE TERMS FOR LUMBAR DISC DISEASE - LINE 7, THEN COMBINE WITH ‘FOOT DROP’ – LINE 8

<table>
<thead>
<tr>
<th>#</th>
<th>Searches</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Peroneal Neuropathies/</td>
<td>611</td>
</tr>
<tr>
<td>2</td>
<td>(foot drop or footdrop or drop foot).mp.</td>
<td>1541</td>
</tr>
<tr>
<td>3</td>
<td>1 or 2</td>
<td>1991</td>
</tr>
<tr>
<td>4</td>
<td>intervertebral disc/ or lumbar vertebrae/</td>
<td>58236</td>
</tr>
<tr>
<td>5</td>
<td>Intervertebral Disc Displacement/ or Intervertebral Disc Degeneration/</td>
<td>21347</td>
</tr>
<tr>
<td>6</td>
<td>lumbar spondylosis.mp.</td>
<td>218</td>
</tr>
<tr>
<td>7</td>
<td>4 or 5 or 6</td>
<td>67384</td>
</tr>
<tr>
<td>8</td>
<td>3 and 7</td>
<td>110</td>
</tr>
</tbody>
</table>
Check ‘Complete Reference’ of key papers

LOOK FOR ADDITIONAL TERMS TO ADD

7. Prediction of Postoperative Clinical Recovery of Drop Foot Attributable to Lumbar Degenerative Diseases, via a Bayesian Network.

Takenaka S; Aono H.


[Comparative Study. Journal Article]

UI: 27913961

Title Comment


Authors Full Name

Takenaka, Shota; Aono, Hiroyuki.
Check ‘Complete Reference’ of key papers

YOU MAY HAVE MISSED IMPORTANT TERMS -

**MeSH Subject Headings:**
- Adult
- Aged
- *Decompression, Surgical*
- Female
- Gait Disorders, Neurologic / et [Etiology]
- Gait Disorders, Neurologic / pp [Physiopathology]
- *Gait Disorders, Neurologic / su [Surgery]*
- Humans
- Intervertebral Disc Degeneration / co [Complications]
- Intervertebral Disc Degeneration / pp [Physiopathology]
- *Intervertebral Disc Degeneration / su [Surgery]*
- Intervertebral Disc Displacement / co [Complications]
- Intervertebral Disc Displacement / pp [Physiopathology]
- *Intervertebral Disc Displacement / su [Surgery]*
- Male
- Middle Aged
- *Muscle Strength / ph [Physiology]*
- Prognosis
- Retrospective Studies
- Time Factors
- Time-to-Treatment
- Treatment Outcome

Consider adding any major MeSH terms (*) – don’t have to restrict to sub-headings
ADD TERMS FROM “COMPLETE REFERENCE” – FOR NEXT CONCEPT
Search for term in title or abstract (.ti,ab.) – to focus search
Ovid Medline

COMBINE 9 OR 10, THEN 8 AND 11

<table>
<thead>
<tr>
<th>#</th>
<th>Search History (11)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Peroneal Neuropathies/</td>
</tr>
<tr>
<td>2</td>
<td>(foot drop or footdrop or drop foot).mp [mp=title abstract original title name of substance word subject heading protocol supplementary concept word rare disease supplementary concept word unique identifier synonyms]</td>
</tr>
<tr>
<td>3</td>
<td>1 or 2</td>
</tr>
<tr>
<td>4</td>
<td>Intervertebral disc or lumbar vertebrae/</td>
</tr>
<tr>
<td>5</td>
<td>Intervertebral Disc Displacement or Intervertebral Disc Degeneration/</td>
</tr>
<tr>
<td>6</td>
<td>lumbar spondylosis.mp</td>
</tr>
<tr>
<td>7</td>
<td>4 or 5 or 6</td>
</tr>
<tr>
<td>8</td>
<td>3 and 7</td>
</tr>
<tr>
<td>9</td>
<td>Decompression, Surgical/</td>
</tr>
<tr>
<td>10</td>
<td>(surgery or surgical).ti,ab.</td>
</tr>
<tr>
<td>11</td>
<td>9 or 10</td>
</tr>
</tbody>
</table>

Save  Remove  Combine with:  AND  OR
Tip: Don’t use Full Text limit. This limits to only those 300 or so FT journals in Ovid; we have access to thousands of journals through other sources.

Add few or no limits if there are a small set of results
Change databases to Embase

FROM SEARCH SCREEN, CLICK “CHANGE”
Choose Embase

CLICK “OK” TO GO TO EMBASE DATABASE

Do not click ‘Run Search’ as Medline and Embase databases are incompatible. You cannot run your previous Medline search on Embase.
Search Embase

PLATFORM IS THE SAME BUT DATABASE IS DIFFERENT

Embase
Embase

USES A THESAURUS (SUBJECT INDEXING) CALLED ‘EMTREE’. IT IS DIFFERENT TO MEDLINE SO SEARCH RESULTS ARE ALSO DIFFERENT.

‘foot drop’ maps to a different subject heading in Embase (compared to Medline: Peroneal neuropathies/)
Embase search

SAME METHOD AS MEDLINE; DIFFERENT SUBJECT HEADINGS AND RESULTS

<table>
<thead>
<tr>
<th></th>
<th>Query</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>foot drop.mp. or peroneus nerve paralysis/</td>
<td>3888</td>
</tr>
<tr>
<td>2</td>
<td>intervertebral disk hernia/</td>
<td>15007</td>
</tr>
<tr>
<td>3</td>
<td>lumbar vertebra/</td>
<td>16641</td>
</tr>
<tr>
<td>4</td>
<td>2 or 3</td>
<td>29706</td>
</tr>
<tr>
<td>5</td>
<td>1 and 4</td>
<td>92</td>
</tr>
<tr>
<td>6</td>
<td>decompression surgery/</td>
<td>17529</td>
</tr>
<tr>
<td>7</td>
<td>5 and 6</td>
<td>11</td>
</tr>
<tr>
<td>8</td>
<td>peroneus nerve paralysis/su [Surgery]</td>
<td>177</td>
</tr>
<tr>
<td>9</td>
<td>4 and 8</td>
<td>5</td>
</tr>
<tr>
<td>10</td>
<td>lumbar.ti.ab.</td>
<td>134903</td>
</tr>
<tr>
<td>11</td>
<td>4 or 10</td>
<td>149440</td>
</tr>
<tr>
<td>12</td>
<td>8 and 11</td>
<td>14</td>
</tr>
<tr>
<td>13</td>
<td>surgery.ti.ab.</td>
<td>1444357</td>
</tr>
<tr>
<td>14</td>
<td>6 or 13</td>
<td>1454914</td>
</tr>
<tr>
<td>15</td>
<td>1 and 11 and 14</td>
<td>161</td>
</tr>
<tr>
<td>16</td>
<td>intervertebral disk degeneration/</td>
<td>10269</td>
</tr>
<tr>
<td>17</td>
<td>11 or 16</td>
<td>154104</td>
</tr>
<tr>
<td>18</td>
<td>1 and 14 and 17</td>
<td>164</td>
</tr>
</tbody>
</table>

Embase usually has more results than Medline as it includes conference abstracts & Medline does not.
Embase – Save Search. Also applies to Medline

EMBASE COMPLETED SEARCH. SAVE IT – CLICK ON ‘SAVE ALL’ THEN LOGIN
WITH OVID PERSONAL ACCOUNT LOGIN
Ovid Medline/Embase Login

USE PERSONAL ACCOUNT LOGIN TO ACCESS SAVED SEARCHES AND TO SAVE A SEARCH

Personal Account Login

Personal Account Name:
MSimons

Password:

Login

Don't have an Account?

Create Account

Forgot Account Name or Password?
Ovid Saved Searches

Give search a name, then click save (as a permanent search)
Ovid Medline/Embase. Find Saved Search

FIND A SAVED SEARCH. FROM SEARCH SCREEN CLICK ON ‘MY ACCOUNT’ OR ‘VIEW SAVED’
Ovid platform Saved Searches

FIND SAVED SEARCH – TICK BOX, THEN ‘RUN’ AT BOTTOM OF SCREEN
Scopus Database

LARGE DATABASE THAT USES KEYWORDS.
INITIAL SEARCH YIELDED ONLY 24 RESULTS
**Order of precedence rules**

Searches with multiple operators are processed in the following order:

1. **OR**
2. **AND**
3. **AND NOT**

After the precedence rules are applied, the search is read left to right.

<table>
<thead>
<tr>
<th>All these searches...</th>
<th>are processed as...</th>
</tr>
</thead>
<tbody>
<tr>
<td>KEY (mouse OR rat AND rodent)</td>
<td></td>
</tr>
<tr>
<td>KEY (rodent AND rat OR mouse)</td>
<td></td>
</tr>
<tr>
<td>KEY (rat OR mouse AND rodent)</td>
<td></td>
</tr>
<tr>
<td>KEY (mouse OR rat) AND rodent</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>This search...</th>
<th>is processed as...</th>
</tr>
</thead>
<tbody>
<tr>
<td>KEY (mouse AND NOT cat OR dog)</td>
<td></td>
</tr>
<tr>
<td>KEY (cat AND dog AND NOT rodent OR mouse)</td>
<td></td>
</tr>
<tr>
<td>KEY((mouse) AND NOT (cat OR dog))</td>
<td></td>
</tr>
<tr>
<td>KEY((cat AND dog) AND NOT (rodent OR mouse))</td>
<td></td>
</tr>
</tbody>
</table>
Order of precedence:

Ovid databases (Medline, Embase) process operators in the following order:
1. NOT
2. AND
3. OR

Use *parentheses* to override operator precedence. For example:

- `influenza OR flu AND avian` finds records containing the word *influenza*. It also finds records containing both *flu* and *avian*.
- `(influenza OR flu) AND avian` finds records containing both *influenza* and *avian* or both *flu* and *avian*.
Use NOT sparingly

Use the NOT operator carefully or you might eliminate relevant articles.

For example, in the search **health reform not health maintenance organizations** records containing information about **health maintenance organizations** have been eliminated; but also, you may have eliminated records that discuss both **health reform and health maintenance organizations**.
BROADEN SEARCH 103 RESULTS. ADD SYNONYMS FOR LUMBAR DEGENERATION AND FOR THE INTERVENTION. USE PARENTHESES TO SPECIFY ORDER

**Tip:** enclose phrases in quotation marks or each word will be searched separately as well as together, eg “foot drop” vs foot drop
Scopus: check key titles

ARE THERE SUBJECT HEADINGS OR AUTHOR KEYWORDS TO ADD? CHECK CITING PAPERS AND REFERENCE LISTS FOR ADDITIONAL PAPERS

Check citing documents for additional results

Check Author keywords and subject headings

Check hyperlinked References below

References (18)