Evidence-Based Dentistry Lecture Series

Evidence-based Searching Skills
Part 2: PUBMED Advanced Search

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NUS Medical Library

22 July 2019
PubMed Advanced Search

PubMed simple search
  - Keywords

Advanced/comprehensive search
  - Subject heading (MeSH in PubMed)
  - Keywords
  - Developing search strategy
  - Refining search using filters
Clinical Scenario

Jerry is a **13-year-old** boy who does not brush his teeth at bedtime. He likes sticky foods and candy. During routine dental screening at school, the dental therapist rated his oral hygiene as “poor”. He already has 2 fillings on his permanent teeth. Jerry’s mother is concerned and brings him to your clinic. She heard from her colleague that topical fluoride treatment or a fissure sealant would be helpful since Jerry is quite careless when it comes to brushing his teeth. She wants to know if a **fissure sealant** or a **topical fluoride** treatment is more effective in preventing tooth decay. What advice would you provide her?
“Is fissure sealants or topical fluoride treatment more effective in tooth decay prevention in teenagers?”

OR

“Is fissure sealants more effective than topical fluoride treatment in preventing tooth decay in teenagers?”

OR

“What is the effectiveness of fissure sealants compared to topical fluoride in preventing tooth decay in teenagers?”
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PubMed Simple Search Using Keywords

What is keyword?

**Synonyms**
e.g. (Tooth decay OR tooth caries OR dental decay OR dental caries OR carious dentin OR dental carious OR carious lesion)

**Phrases**
e.g. (“topical fluoride” OR “topical fluorides”) → 4744 hits

How to broaden your search?
e.g. (topical OR varnish*) **AND** (fluoride OR fluorides) → 5782 hits

How to combine PICO elements?
e.g. (fissure sealants **AND** topical fluoride)
e.g. (fissure sealants **AND** topical fluoride **AND** tooth decay)
PubMed Simple Search Using Keywords

PubMed.gov

Search results

1. School-based dental sealant programmes may be effective in caries prevention.
   PMID: 28338038
   Similar articles

2. Evidence-based Clinical Practice Guideline for the Use of Pit-and-Fissure Sealants
   [No authors listed]
   PMID: 26208086
   Similar articles

3. Pit and fissure sealants or fluoride varnishes?
   PMID: 27755142
   Similar articles

Search details

("fluorides, topical"[MeSH Terms] OR ("fluorides"[All Fields] AND "topical"[All Fields])) OR "topical fluorides"[All Fields] OR ("topical"[All Fields])

See how PubMed executes your search
How PubMed Interpret Your Search

Search Details

<table>
<thead>
<tr>
<th>Translations:</th>
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</thead>
<tbody>
<tr>
<td><strong>fissure sealants</strong></td>
</tr>
<tr>
<td>&quot;pit and fissure sealants&quot;[MeSH Terms] OR (&quot;pit&quot;[All Fields] AND &quot;fissure&quot;[All Fields] AND &quot;sealants&quot;[All Fields]) OR &quot;pit and fissure sealants&quot;[All Fields] OR (&quot;fissure&quot;[All Fields] AND &quot;sealants&quot;[All Fields]) OR &quot;fissure sealants&quot;[All Fields]</td>
</tr>
<tr>
<td><strong>topical fluoride</strong></td>
</tr>
<tr>
<td>&quot;fluorides, topical&quot;[MeSH Terms] OR (&quot;fluorides&quot;[All Fields] AND &quot;topical&quot;[All Fields]) OR &quot;topical fluorides&quot;[All Fields] OR (&quot;topical&quot;[All Fields] AND &quot;fluoride&quot;[All Fields]) OR &quot;topical fluoride&quot;[All Fields]</td>
</tr>
<tr>
<td><strong>tooth decay</strong></td>
</tr>
<tr>
<td>&quot;dental caries&quot;[MeSH Terms] OR (&quot;dental&quot;[All Fields] AND &quot;caries&quot;[All Fields]) OR &quot;dental caries&quot;[All Fields] OR (&quot;tooth&quot;[All Fields] AND &quot;decay&quot;[All Fields]) OR &quot;tooth decay&quot;[All Fields]</td>
</tr>
</tbody>
</table>

- In Basic Search, PubMed maps out the MeSH terms
- Keywords are searched in “All Fields”
fissure sealants AND topical fluoride AND tooth decay

1. **Dental caries prevention in children and adolescents: a systematic quality assessment of clinical practice guidelines.**
   PMID: 29524023
   [Similar articles](https://pubmed.ncbi.nlm.nih.gov/29524023/)

2. **Pit and fissure sealants versus fluoride varnishes for preventing dental decay in the permanent teeth of children and adolescents.**
   Ahovuo-Saloranta A, Forss H, Hiiri A, Nordblad A, Mäkelä M.
   PMID: 26780162
   [Similar articles](https://pubmed.ncbi.nlm.nih.gov/26780162/)

3. **Non-surgical treatment of dentin caries in preschool children—systematic review.**
   Dongottin D, Liang M, Chu CH, Lo EC.
PubMed: Useful EBD Filters

- Systematic Reviews of RCTs
- RCTs
- Other Controlled Clinical Trials
- Observational Studies (Cohort and Case-Control)
- Case Studies, Anecdotes, Bench Studies, Personal Opinion

Article types:
- Practice Guideline
- Randomized Controlled Trial
- Systematic Reviews
PubMed Advanced Search

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What is MeSH?

-Medical Subject Heading

-Controlled vocabulary used by indexer to index the articles.

Human indexers read articles in MEDLINE and assign standardised terms called MESH

“Dental caries” is the designated subject heading for the concept.
Accessing MeSH Database

2 ways to access MeSH database via PubMed Homepage

Or via PubMed Advanced Search
Dental Caries

Localized destruction of the tooth surface initiated by decalcification of the enamel followed by enzymatic lysis of organic structures and leading to cavity formation. If left unchecked, the cavity may penetrate the enamel and dentin and reach the pulp.

Year introduced: DENTAL CARIES CONTROL was heading 1966-1966
Understand the MeSH Hierarchy

By default, MeSH database will include the search for MeSH terms below in the hierarchy, i.e. “automatic explosion”.

PubMed may suggest related terms, including both broader & narrower terms.
The MeSH Entry Terms

Entry term = Synonyms/Keywords

This is one of the ways to find keywords/synonyms to build the keyword search strategy:

E.g.
(dental decay OR carious dentin OR carious dentins OR dental white spot OR OR dental white spots)

Borrow your synonyms/keywords from Entry Terms.
PubMed Advanced Search

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Developing Search Strategy

“Is fissure sealants more effective than topical fluoride treatment in preventing tooth decay in teenagers?”

<table>
<thead>
<tr>
<th>MeSH</th>
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<tr>
<td>Keywords</td>
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<td>topical fluoride</td>
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<td></td>
<td>teens</td>
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<td>fluoride varnish</td>
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<td></td>
<td>youths</td>
<td>dental sealants</td>
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<td>carious lesion</td>
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</tbody>
</table>
Click on “Advanced” from PubMed homepage to go to PubMed “Advanced Search Builder” shown below:

By default, search is executed in “All Fields”

Click on “Add to history” to remain in “Advanced Search Builder”

Click on “Search” to go to PubMed results page
Search Strategy For Intervention- ‘fissure sealant’

Step 1. Search the MeSH term ‘fissure sealant’
Step 2. Build keyword search strategy and append the ‘Title/Abstract’ field

fissure sealant* OR dental sealant* OR tooth sealant*
Step 3. Combine the MeSH AND keyword search strategy “fissure sealant” using ‘OR’ (refer to instruction in the box highlighted)

Click ‘Add ’ button to add #7 into the Builder box
Repeat for #6
Change the Boolean operator to 'OR'
Click ‘Add to history’
Search Strategy For Intervention - ‘fissure sealant’

Congratulations! You have built the search on “fissure sealant”
See search strategy below

("Pit and Fissure Sealants"[Mesh]) OR ((fissure sealant*[Title/Abstract] OR dental sealant*[Title/Abstract] OR tooth sealant*[Title/Abstract]))

<table>
<thead>
<tr>
<th>History</th>
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<th>Query</th>
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<tbody>
<tr>
<td>#9</td>
<td>Add</td>
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<tr>
<td>#8</td>
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<tr>
<td>#7</td>
<td>Add</td>
<td>Search &quot;Pit and Fissure Sealants&quot;[Mesh]</td>
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</tbody>
</table>
Search Strategy For Comparator - 'topical fluoride'

1. Search ‘topical fluoride’ in MeSH database (see line #10)
2. Build the keyword search statement below (see line #11)
   (topical fluoride[Title/Abstract] OR topical fluorides[Title/Abstract] OR fluoride varnish[Title/Abstract] OR fluoride varnishes[Title/Abstract])
3. Combine 1 AND 2 using ‘OR’ (see line #12)
   ("Florides, Topical"[Mesh]) OR ((topical fluoride[Title/Abstract] OR topical fluorides[Title/Abstract] OR fluoride varnish[Title/Abstract] OR fluoride varnishes[Title/Abstract])

Repeat the same steps as shown in slides 20-22; i.e.
1. Search ‘topical fluoride’ in MeSH database (see line #10)
2. Build the keyword search statement below (see line #11)
   (topical fluoride[Title/Abstract] OR topical fluorides[Title/Abstract] OR fluoride varnish[Title/Abstract] OR fluoride varnishes[Title/Abstract])
3. Combine 1 AND 2 using ‘OR’ (see line #12)

("Florides, Topical"[Mesh]) OR ((topical fluoride[Title/Abstract] OR topical fluorides[Title/Abstract] OR fluoride varnish[Title/Abstract] OR fluoride varnishes[Title/Abstract])

<table>
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<tr>
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(("Pit and Fissure Sealants"[Mesh]) OR (fissure sealant*[Title/Abstract] OR dental sealant*[Title/Abstract] OR tooth sealant*[Title/Abstract]))) AND ("Fluorides, Topical"[Mesh]) OR ((topical fluoride[Title/Abstract] OR topical fluorides[Title/Abstract] OR fluoride varnish[Title/Abstract] OR fluoride varnishes[Title/Abstract]))

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<tr>
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<td>3310</td>
</tr>
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Click result link to see PubMed results

(i.e. line #13)
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Refining Search With Filter

Sort by “Best match”
Comparing Keyword & MeSH Searches

Less precise, but current

Keyword

MeSH

Precise, but slightly dated
Comprehensive Search Strategy

- Keywords (added by author)
- OR
- Subject headings e.g. MeSH(PubMed)/Emtree(EMBASE) (added by indexer)

All articles on that concept
In Summary

For advanced search:
- Identify the indexing term (MeSH)
- If there are no MeSH terms then use keywords
- Combine keywords and MeSH using the correct Boolean operators (AND/OR)

Apply filters especially when there are many references or if you need to distinguish between the types of studies found (optional)

Typical filters used in PubMed Search:
- Article type (e.g. Systematic reviews, Practice Guidelines etc)
- Language
- Publication date
- Age
Thank you

Have a Nice Day

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