



Reflection on Learning

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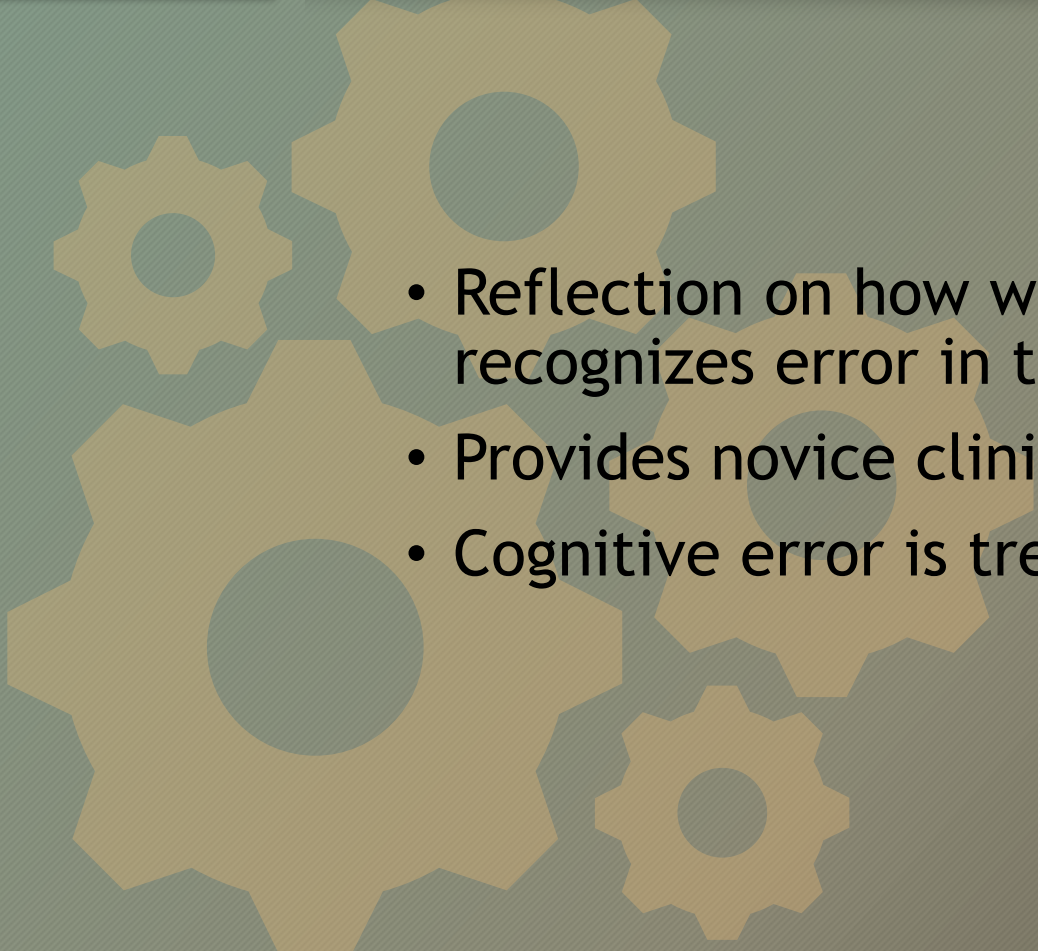
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Relevance

- Diagnostic error
 - Major diagnostic errors are found in 10% - 20% of autopsies
 - When patients see a doctor for a new problem, the average diagnostic error rate may be as high as 15 percent.
- Consequences of diagnostic error
 - 2nd leading cause of adverse events in medical errors
 - Associated with higher morbidity
 - Most frequent cause of lawsuits

Graber, M. (2013). The incidence of diagnostic error in medicine, *British Medical Journal Quality & Safety*, doi: 10.1136/bmjqs-2012-001615

Relevance

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- Reflection on how we reason increases understanding and recognizes error in the process
 - Provides novice clinicians with strategies to improve
 - Cognitive error is treatable

Dual Process Theory of Cognition

Reasoning starts in System 1 and if the problem is complex, unusual, or unclear we resort to System 2

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System 1

Intuitive
Associative
Experiential
Pattern recognition

System 2

Analytic
Deliberate
Rational
Careful analysis

Retrieving Information from Memory

- Information is most easily retrieved when learning takes place in the context in which the knowledge will be used
- Degree of match between conditions of acquiring and retrieval of information is important for the success of retrieving information from memory
- Continuing exposure is necessary for students to develop expertise

Semantic Qualifiers

- Paired opposing descriptors that can be used *to compare and contrast* diagnostic considerations
- Associated with strong reasoning → help the students sort through differentials
- Several implied pairs when considering hypotheses for a diagnosis of gout:
 - multiple (not single)
 - discrete (not continuous) episodes
 - abrupt (not gradual) onset
 - severe (not mild) pain
 - single joint (not multiple joints)

Scripts

- Scripts are a way for learners to mentally organize the features of classic presentations, promoting ease of comparison.
- Developed by knowledge and refined through experience
- Uses compare & contrast of packets of information; learn about the subjects in relation to each other.
- Accurate & efficient
- Has structure

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Scripts

A good script is constructed by focusing on the features that differentiate the subjects.


In reality, these may form without conscious thought but we can facilitate their formation and accuracy.

In the absence of a memory framework relevant to the information at hand, it is difficult to learn & store new information.

Novices tend to try to memorize all facts, without prioritizing.

Horizontal Reading

- Driven by a need to learn about a subject in its entirety
- Requires memorization without framework

DZ/Cond	Mech	Epi	Time Course	Symptoms	Signs	Dx Tests	Treatment/Prognosis
Goodpasture's syndrome							

Vertical Reading

Build knowledge stores that emphasize compare & contrast

Imbed new knowledge in a way that makes it accessible in practice

Knowledge organization is as important as knowledge acquisition

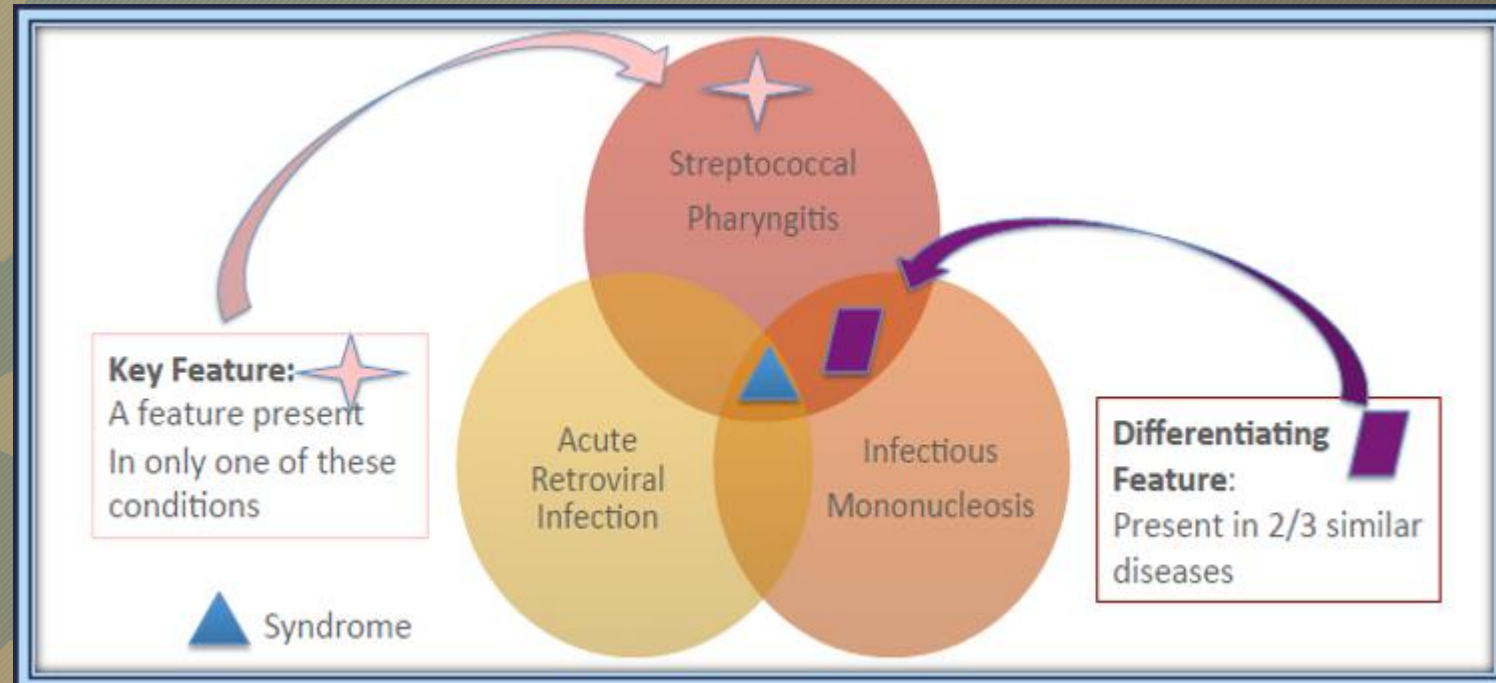
Triggered by a real world experience rather than textbook organization

Make reading active- to seek information


Example

Disease/ Syndrome Ear Pain	Epidemiology	Time Course	Syndrome Statement/Signs & Symptoms	Mechanism of the disease(Pathophysiology)
Otitis Media	<ul style="list-style-type: none"> Age: children-6 to 24 MO, decreased risk >7 YO, rare in adult Race: American Indians, Eskimos Season: fall and winter Gender: M>F Risk Factors: allergies, craniofacial abnormalities, exposure to environ irritants, day care, GERD, pacifier, not breastfed, immunodeficiency, down syndrome, history upper resp infection*, family history 	<ul style="list-style-type: none"> Acute Recurrent: 3+ episodes in past 6 months or 4+ episodes in 12 months with 1 episode in last 6 months 	<ul style="list-style-type: none"> Diagnostic criteria: moderate to severe bulging of TM*, new onset otorrhea without otitis externa, mild bulging of TM with onset of pain within 48 hours Decreased mobility of TM* C/O: ear pain* with possible increase when lying down, fever, irritability*, hearing decrease/change, sleep disturbance, sensation of fullness or pressure in ear, sudden decrease in pain with rupture of TM, pulling ear*, decreased appetite* 	<ul style="list-style-type: none"> Inflammation of air containing middle ear usually associated with bacterial or viral infection-can be sterile Eustachian tubes inflamed, unable to drain correctly = negative pressure in middle ear Negative pressure draws in nasopharyngeal secretions = infection Children more at risk d/t shorter, more horizontal Eustachian tubes Most common: Streptococcus pneumoniae, Haemophilus influenzae, Moraxella catarrhalis
Otitis Externa	<ul style="list-style-type: none"> Age: mostly adults but any age Gender: m = f Season: summer Risk factors: trauma to external canal, swimming*, humid climates, hearing aids, immunocompromised state, chronic disease, malnutrition, inflammatory skin conditions 	<ul style="list-style-type: none"> Acute Chronic- lasts longer than 3 MO 	<ul style="list-style-type: none"> Diagnostic criteria: onset within 48 hours within 3 weeks AND signs ear canal inflammation AND symptoms ear canal inflammation C/O: ear pain, itching, fullness, hearing loss, jaw pain, tenderness of external structures-especially with movement*, ear canal edema, erythema, otorrhea*, no fever* 	<ul style="list-style-type: none"> Breakdown of skin (protective barrier) = increased infection risk Generally bacterial, sometimes fungal infection of ear canal Infection = inflammation Most common: Pseudomonas aeruginosa, Staphylococcus aureus
Bell's Palsy	<ul style="list-style-type: none"> Age: median onset 40 YO, low incidence < 10 YO, 15-45 YO Gender: m = f Risk factors: pregnancy, diabetes mellitus, family history of bell's palsy, upper resp. infection, 	<ul style="list-style-type: none"> Rapid onset* May progress for a few days after onset 85% recover in 3 weeks w/o tx 	<ul style="list-style-type: none"> Diagnosis of exclusion Diagnostic criteria: onset less than 72 hours*, unilateral*, rule out other causes C/O: pain in/around ear*, facial muscle weakness*, difficulty chewing, inability to close eye (not open) *, taste changes, paresthesia of cheek/mouth, eye pain, tearing of eyes, rarely bilateral* 	<ul style="list-style-type: none"> Idiopathic dysfunction/paralysis CN7 Possibly associated with HSV, varicella, EBV or Lyme disease Inflammation or edema compresses CN7 in region of temporal bone = resulting symptoms

Compare & Contrast Thinking



Example



Cells	Cell Wall	Centrosome	Vacuole	Cytoplasm
Plant				
Animal				

Example

My mistress' eyes are nothing like the sun;
 Coral is far more red than her lips' red;
 If snow be white, why then her breasts are
 dun;
 If hairs be wires, black wires grow on her
 head.
 I have seen roses damask'd, red and white,
 But no such roses see I in her cheeks;
 And in some perfumes is there more delight
 Than in the breath that from my mistress
 reeks.
 I love to hear her speak, yet well I know
 That music hath a far more pleasing sound;
 I grant I never saw a goddess go;
 My mistress, when she walks, treads on the
 ground:
 And yet, by heaven, I think my love as rare
 As any she belied with false compare.

Poetry types	Themes	Tone	Imagery	Language
Sonnet				
Haiku				
Free verse				

An old silent pond...
 A frog jumps into the pond,
 splash! Silence again.