Advanced Cardiac Examination: A Journey Through Time

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Objectives

1. Describe the history of the development of cardiac examination techniques.
2. Use evidence-based medicine for testing accuracy of different bedside techniques
3. Self-assess clinical skills in cardiac examination
The Father of Percussion

Joseph Leopold Auenbrugger provided the first comprehensive description of percussion of the chest in his 1761 monograph.

Jean Nicholas Corvisart, the prominent French physician, physician to Napoleon Bonaparte, and teacher of Laennec moved percussion into the mainstream of medical practice.
Medical Instruments for Percussion

Flint's Pleximeter made of hard rubber on the left and Flint's Percussor with rubber head and hard rubber handle on the right, circa 1880.
Father of Auscultation: Rene Laënnec (1781-1826)

French physician
Invented cylinder stethoscope
  • Originally made from paper; later made from hallow wooden tube

Hailed as Father of Thoracic Medicine
Stethoscopes: Then and Now
Importance of PE skills?

- **Flegel KM.** Does the physical examination have a future? *CMAJ.* 1999;161(9):1117-8.
Competency in Cardiac Examination Skills in Medical Students, Trainees, Physicians, and Faculty

A Multicenter Study

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Figure 1. Mean test scores for cardiac examination competency by training level. The dotted horizontal line indicates the mean score for all participants (53.24). The mean score for full-time faculty (FCF) was not significantly different from that of medical students, internal medicine (IM) residents, family medicine (FM) residents, or other practicing physicians (clinical faculty [VCF] and private practice [PP]). Mean scores were improved in third- and fourth-year students compared with first- and second-year students (P < .005), but they did not improve thereafter. Asterisk indicates P < .045. Error bars represent 95% confidence intervals.
Why physicians have problems with clinical competency now?
Were physicians more clinical competent in the past?
Reduction of Bedside Teaching in the US

1960: 75%
1978: 16%
2002: 10%
Physical examination is still important
Hypothesis based
Evidence based

But skills are inadequate

<table>
<thead>
<tr>
<th>Trainee</th>
<th>Type of Exam</th>
<th>Skills</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal Medicine</td>
<td>Rectal</td>
<td></td>
<td>Wilt et al. JGIM. 1991.</td>
</tr>
<tr>
<td>Family medicine</td>
<td>Pelvic</td>
<td></td>
<td>Lang et al. F. Family medicine. 1990.</td>
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Developmental Milestones for Internal Medicine Training – Patient Care

<table>
<thead>
<tr>
<th>Performing a physical examination</th>
<th>Standardized patient Direct observation Simulation</th>
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<tr>
<td>1. Perform an accurate physical examination that is appropriately targeted to the patient's complaints and medical conditions. Identify pertinent abnormalities using common maneuvers</td>
<td>6</td>
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<td>2. Accurately track important changes in the physical examination over time in the outpatient and inpatient settings</td>
<td>9</td>
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<td>3. Demonstrate and teach how to elicit important physical findings for junior members of the health care team</td>
<td>18</td>
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<td>4. Routinely identify subtle or unusual physical findings that may influence clinical decision making, using advanced maneuvers where applicable</td>
<td>30</td>
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Comparison of Students and Cardiologists in Diagnosing Cardiac Findings

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<tr>
<th></th>
<th>Students</th>
<th>Cardiologists</th>
<th>P values</th>
</tr>
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<tbody>
<tr>
<td>Total correct diagnosis</td>
<td>75 %</td>
<td>49 %</td>
<td>P &lt;0.001</td>
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<tr>
<td>Systolic murmurs</td>
<td>93 %</td>
<td>62 %</td>
<td>P &lt;0.001</td>
</tr>
<tr>
<td>Diastolic murmurs</td>
<td>75 %</td>
<td>16 %</td>
<td>P &lt;0.001</td>
</tr>
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Recommendations

1. UME PE education systematic review underway
2. Evaluate the use of deliberate practice and human examinees to teach PE
3. Develop a GME PE blueprint
   A. Specific PE skills graduating residents should have
   B. What competence in these skills entails
   C. How these skills are best taught and evaluated
A 45 y-o patient has had 3 days history of fever and progressive shortness of breath. Patient has unremarkable medical history; and takes no medications.
BP 110/95 mmHg; HR 112; RR 18; T 101F.
Awake, alert X3. JVD 4 cm above clavicle. Lungs are clear to auscultation. Cardiac auscultation
What will you do next?

1. Order Valsalva maneuver
2. Order amyl nitrite inhalation
3. Squatting
4. Observe for Kusmaul’s sign
5. Perform pulsus paradoxus
The Stethoscope

Rene Laennec, who invented the first stethoscope, commented that "no patient report could suffice to characterize disease, and that for a certain diagnosis, mediate auscultation is required."