

# Making physical examination in medicine user-friendly

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## ABSTRACT

Physical examination (PE) techniques used in medical schools appear redundant in several aspects: unnecessarily regimental, lacking in efficiency, and lengthy. Many techniques are sustained solely because of the age-old tradition. This commentary suggests a simplification of PE techniques to make them acceptable to all the stakeholders, such as patients, medical students, and medical teachers. This is especially relevant in this era when imaging is widely used for diagnosis, and the confidence and reliance on PE are declining. Opinions of 10 senior consultants active in medical practice, teaching, and assessment were sought to know their concurrence with the authors' views. Seven of them provided their opinions, which showed considerable agreement with the authors' views regarding PE. All the items presented in this paper are mostly supported by the opinions of the senior consultants, textbooks, and literature. We consider sharing this work with the fraternity worthwhile.

## KEYWORDS:

*physical examination; physical signs; jugular venous pressure*

## INTRODUCTION

Prevailing anomalies in physical examination (PE) have been disturbing. Some traditional methods make PE lengthy and cumbersome. History taking and PE should not be tiringly long and uncomfortable for the patients and the doctors. It is reassuring that many doctors still believe that history taking and PE are essential, and doctor-patient rapport should be at the heart of medical care.<sup>1-11</sup> If the art and science of clinical medicine are not implanted in medical students from the beginning of their training, it would be impossible to attain this goal.<sup>12</sup> There were errors repeated by students year after year, which point to the care needed in training<sup>12</sup> and the existence of problems in PE methods. We see the trend of clinical acumen being eroded by algorithms and guidelines dictating clinical practice. If the technology takes over, as it appears to happen in recent times, (i) clinical teaching would wither, (ii) patient management would become less efficient, (iii) medical errors would increase,<sup>13</sup> healthcare would become exorbitant, and litigations surge.<sup>4,7,9,11,14,15</sup> The unavailability or lack of standardisation in patients has led to the use of trained actors and simulators for teaching and assessment. Actors, unlike real patients, offer uniformity and consistency. However, simulations used to teach medical students might not match the real.<sup>4</sup> The currently insisted PE regime and methods are constraining for medical students, patients, and teachers. Imaging might

compensate for a lack of expertise in PE, but it will be problematic in emergencies.<sup>5</sup> Knowledge of the pathophysiology of clinical signs is vital for interpretations.<sup>16</sup> Moreover, investigations become more meaningful and easy to interpret when done in the light of clinical diagnosis.<sup>15,17,18</sup>

Medical students learn PE system by system, but as doctors, they would need to adopt a holistic approach. Sub-specialisation compartmentalises the body systems, but the approach has to be holistic in terminal stages and the elderly. All systems should be examined in order to avoid surprises. For all these to become practical, PE needs to become easier, faster, efficient, and user-friendly. Hence, we recommend some modifications in the difficult areas of PE.

## Endorsement for our recommendations

To cater legitimacy to our views, the opinions of 10 consultants active in medical practice, teaching, and assessment of medical students from four institutions were sought through email using 105 statements from problematic areas of PE. Seven of them responded. All agreed to the opening statement, "There are areas in physical examination in medicine that can be modified to make them less regimental and more efficient." Forty-one suggestions received full and 24 majority endorsement. Forty items received partial endorsement with very little comments because they did not belong to their speciality. The most senior among them showered praises for the project and agreed with all items except two. Forty items with authors' conviction, textbook, and literature support are presented. Harrison's Principles of Internal Medicine 21st edition, which appeared after this project, was found to support many of the authors' views.

## Simplifying JVP examination

Jugular venous pressure / pulse (JVP) is important for all areas except neurology. Many authors consider its assessment difficult, inaccurate, time-consuming, and tedious.<sup>1,32,33</sup> In practice, the clinician needs to know whether JVP is raised or not, not its exact measurement.<sup>32,34</sup> Except in very thin and elderly, where carotid pulsation may be visible, no pulsation is visible in the neck of a healthy individual in sitting or standing position.<sup>1</sup> The vertical distance from the sternal angle to the clavicle is around 6 cm, and the normal JVP is only 3 or 4 cm. So, if venous pulsation is seen above the clavicle in upright position with legs dangling, JVP is raised.<sup>22</sup> Hepatojugular reflux, an uncomfortable procedure, is often used to assess JVP.<sup>3</sup> It is much easier to inspect the neck in an upright position for this purpose. The common practice of asking the patient to turn the head to the left makes the

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**Table I: Recommendations for improving physical examination**

No.	Physical examination: recommendations for improvement	Status
1	Do not diagnose anaemia by inspection of palms alone. Use conjunctivae and tongue. <sup>19</sup>	FE
2	Feel the hands. Cold and sweaty hands indicate circulatory failure. <sup>19</sup>	Literature
3	Examine both eyes to avoid missing abnormalities of pupils, conjunctivae, and sclera. <sup>1</sup>	Literature
4	Use swinging light to demonstrate consensual light reflex and afferent pupillary defect. A quick swing of light would show the state of the pupil before it resumes its original size. <sup>20</sup>	ME
5	Use a spatula to expose teeth and gums to check oral hygiene. A casual look into oral cavity will miss dental caries and gingivitis. <sup>18,19</sup>	FE
6	Do not insist on the 45° incline for cardiovascular examination. Any incline which shows jugular venous pulse (JVP) should be acceptable. <sup>21</sup> The precordial examination is unaffected by the incline. With the patient sitting upright and legs dangling, raised CVP is ruled out, if no JVP is seen. <sup>22</sup>	Literature
7	Avoid the routine lifting of arm to elicit collapsing pulse. It is unnecessary and misleading. Appreciate the slapping/bounding character of pulse in conditions causing collapsing pulse. Use arm lifting to confirm this, if necessary. <sup>19,23,24</sup>	ME
8	Use the midline as the landmark for apex beat location, as midclavicular line (MCL) is subjective. <sup>13,25,26</sup> But for keeping the tradition, the use of MCL has no advantage. Use the midline as the landmark for apex beat location, as MCL is subjective. <sup>13,25,26</sup>	Literature
9	Separate fingers and press them into intercostal spaces to feel the apex beat. It is often missed otherwise.	AO
10	Examine the peripheral pulses also in CVS examination. Peripheral arteries reflect condition of coronary and cerebral arteries. <sup>20</sup>	Literature
11	Using thumb for pulse examination is more convenient in many areas, and it is no less efficient than using fingers. <sup>24</sup> Use right thumb to feel left carotid artery.	Literature
12	Inspection and auscultation are the most useful steps in the PE of respiratory system. These can be supplemented with chest expansion, percussion, and vocal fremitus, as required. <sup>20,27</sup>	Literature
13	Look for features of airway resistance like soft tissue recession, pursed-lip breathing, and tachypnoea. <sup>3</sup>	FE
14	Chest deformities are easily missed, if the patient is not inspected in sitting or standing position.	Literature
15	Use fingers to feel tactile vocal fremitus. They are sensitive and easier to apply to axillary and infra-axillary regions, compared to the ulnar border of the hand. <sup>19,20</sup>	FE
16	It is unnecessary and impractical to search for intercostal spaces while percussing and auscultating the chest. <sup>1,19</sup>	ME
17	It is not feasible to estimate chest expansion in numbers on palpation. <sup>1,3,4</sup> Determine which side is expanding less, as all lung pathologies decrease lung expansion.	ME
18	Percuss for superficial cardiac dullness in the left parasternal region, not at MCL. The bare area of the heart does not extend to MCL. Resonance here indicates hyperinflated lung.	AO
19	Inspect the abdomen carefully for organomegaly. Massive organomegalies show on inspection. The umbilicus is deep in obesity, flat and transversely stretched in ascites. <sup>3</sup>	ME
20	Starting palpation of the liver and spleen in the right iliac fossa and advancing cranially breath by breath is disturbing to the patient and unnecessary. Enlarged liver, spleen, large kidneys, and large masses can be felt on superficial palpation. Use deep breathing only to check their downward movement on inspiration. <sup>3,20,28</sup>	Literature
21	Use fingertips rather than the radial border of index finger for palpation of abdominal organs and masses, as they are more sensitive, agile, and user-friendly. <sup>1,3,20,24</sup> Radial border is traditionally used with no advantage and is difficult for palpating the spleen.	ME
22	For ascites, demonstrate that the dullness has shifted to a previously resonant area, not just that the flank has become less dull. <sup>1,20,26,28,29</sup>	Literature
23	The lower border of liver, when palpable, does not need percussion for confirmation, as palpation is more sensitive than percussion. <sup>3</sup>	ME
24	Liver pulsations can be detected by the palm firmly pressed over the right lower thorax, as the liver is positioned above the costal margin. <sup>30</sup> Palpating the liver border for this is unnecessary.	Literature
25	Pressing down the midline of the abdomen while eliciting fluid thrill is needed only when the thrill is present. <sup>1,3,24</sup> It helps to block the waves passing through the abdominal wall.	ME
26	Auscultating abdomen for bowel sounds in one area is sufficient. <sup>1,3,19,20,24</sup>	Literature
27	Auscultate an inch above the umbilicus on either side for renal bruit. <sup>19,24</sup> Renal arteries, branches of the abdominal aorta, are near the midline.	FE
28	Renal punch can be painful and annoying to the patient. Just a thumb pressure is sufficient to elicit renal angle tenderness. <sup>19</sup>	Literature
29	Romberg sign indicates dorsal column dysfunction. <sup>1</sup> Vision helps to maintain body balance when proprioception is impaired. In cerebellar lesions, patient will not be able to stand with feet close together even with eyes open.	Literature
30	Avoid using the term facial asymmetry to indicate facial palsy. Facial symmetry is rare in the population. Examine facial muscle contractions to determine.	AO
31	Use finger wiggle to test visual fields. Colour is not well perceived in the periphery. <sup>20</sup> Using a red pin for peripheral fields is meritless.	SE
32	For eliciting ankle clonus, use eversion and dorsiflexion of the foot. Clonus could be missed, if the foot is dorsiflexed in inversion.	Literature
		AO
		SE

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**Table I: Recommendations for improving physical examination**

No.	Physical examination: recommendations for improvement	Status
33	While eliciting plantar reflex, stop the stimulus as soon as a response is seen. <sup>1,20,31</sup> Continuing the stimulus would make it confusing.	FE Literature
34	While eliciting muscle tone, move the joint through full range, first slowly and then fast. Spasticity, being velocity dependent, can be missed otherwise. <sup>3</sup>	ME Literature
35	While assessing muscle power, isolate the part and allow movement only at the part being tested. Test both sides separately except the shoulder and hip abduction and adduction.	ME
36	In a cerebral stroke, trapezius muscle, innervated by cranial nerve XI, could be weak, like the lower face. <sup>24</sup> This fact is not well described.	ME
37	Rapid alternating movements like supination-pronation, finger tapping, and foot-tapping could be tested on both sides simultaneously and compared for speed and accuracy. It saves time and allows comparison.	SE
38	Before declaring the sensory system normal, perform discriminatory sensations (cortical sensations) like stereognosis, graphesthesia, and two-sides discrimination. <sup>1,20</sup> Primary sensations are appreciated at thalamus.	Literature
39	Whenever any sensory loss is detected, determine its extent and pattern. <sup>24</sup>	Literature
40	Sensory loss in strokes cannot be confined to face, arm, and leg. There is no anatomical basis for this distribution. It has to be hemisensory loss including the trunk. <sup>3,12</sup>	ME Literature

Status = endorsement from experts and literature, FE = fully endorsed by experts, ME = endorsed by majority of experts, SE = endorsed by some experts, AO = authors' opinion

sternocleidomastoid muscle (SCM) stand out and obscure the JVP.<sup>33</sup> Instead, extending the head relaxes SCM and makes JVP examination easier. Use simultaneous left carotid palpation and right neck inspection to differentiate JVP from carotid pulsation.<sup>33</sup> Hand veins can be used to judge central venous pressure (CVP), if JVP is doubtful.<sup>29</sup> The peripheral veins also reflect CVP, although slower.

*PE need to be sustainable and efficient*

Currently, we are facing two deterrents to clinical training of medical students: (i) practical difficulties in using real patients for teaching and assessment, and PE techniques being too tedious and time-consuming. While the former is hard to resolve, especially in a pandemic-like situation, the latter could be helped.<sup>1,16,32,33</sup> PE techniques could be made less regimental, more efficient, and easier to perform to make them sustainable for medical students and patients, just as Campbell et al. opined.<sup>16</sup> In medical schools, students are trained and assessed examination of each system separately. In clinical practice, PE is done area-wise in a holistic manner.<sup>16</sup> Although compartmentalisation is unlikely to go away, the authors felt that a holistic approach would be more beneficial, practical, and realistic, as suggested by Earl Campbell et al.<sup>16</sup>

**CONCLUSION**

Observation of medical students' ongoing struggle with physical examination techniques and interpretation of findings prompted the authors to highlight this issue and make some recommendations for making physical examination sustainable and easier rather than risk losing its importance in this era of overarching technologies and the demand for quick decisions. Some of the most useful items are included in the table.

**ETHICS APPROVAL**

Approval was obtained from the Ethics Committee of the Faculty of Medicine and Health Sciences of the Universiti Malaysia Sarawak (REF. NO.: FME/21/78) for this project and the use of the questionnaire. Participation in the

questionnaire was voluntary, with no incentives offered. All methods were in accordance with the guidelines and regulations of the Declaration of Helsinki.

**COMPETING INTERESTS**

There is no competing interest.

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