fortune Journals

Research Article

ARCHIVES OF CLINICAL AND MEDICAL CASE REPORTS

ISSN: 2575-9655

Evidence Based Physical Medicine in Internal Medicine

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Abstract

Introduction: The teaching of physical examination is based on medical textbooks. In the era of technology and evidence-based medicine, clinician should be able to perform and accurate physical examination. In this review, we propose a new way of doing physical examination with accuracy.

Methods: We searched PubMed from 1980 to 2022. We included studies that compared physical examination with imaging, electrophysiological studies and intraoperative findings.

Results: We have identified a bare minimum for head to toes examination. The content is vital signs, eyes inspection, mouth inspection, lymph nodes palpation, thyroid palpation, lungs examination (inspection, percussion and auscultation), heart examination (inspection and auscultation), abdomen (inspection and palpation), vascular examination (dorsalis pedis and posterior tibial artery palpation), neurologic examination (eyes movement, facial strength, tongue, thumb rolling test, ankle reflex, gait).

Conclusions: Physical examination of human major systems can be done within 10 minutes with accuracy.

Keywords: Head-to-Toe Examination; Core Physical Examination; Clinical Assessment; Physical Examination Skills; Abdomen Examination; Neurologic Examination; Cardiovascular Examination; Respiratory Examination

Introduction

Medical students perform frequently head-to-toe physical examination (HTTPE or HTTE) also called core physical examination or complete physical examination. It is done for newly admitted patients, for outpatients during ambulatory care and for patients consulting in emergency room. Internists are doing it during consultation of patients and for individuals who wants annual physical examination. This examination gives an overview of the entire human body. It is an essential skill that medical students should master because as general practitioners they will encounter patients in diverse settings with various complaints.

A good diagnosis depends on a good history and physical examination. Performing every textbook stated physical examination maneuver on all new patients has a limiting effect on learning how to integrate physical exam elements driven by hypothesis gotten from history taking; thereby, limiting the development of clinical reasoning during physical exam [1]. Goal targeted physical exam perform on new patients by medical student will reduce cognitive load and enhance their learning [2].

The traditional steps of physical examination are inspection, palpation

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Citation: Zouna Frank, Ngomba Maryl. Evidence Based Physical Medicine in Internal Medicine. Archives of Clinical and Medical Case Reports. 7 (2023): 276-279.

Received: May 15, 2023
Accepted: May 30, 2023
Published: June 19, 2023

Frank Z and Maryl N., Arch Clin Med Case Rep 2023
DOI:10.26502/acmcr.96550612

percussion and auscultation. The physical examination is usually taught by system. For patient with multiple complaints or symptoms such as fatigue, fever HTTE is appropriate. The HTTE is the examination of all major body systems. It should be done in certain order to reduce patient movement. The exact order and content are not known. The HTTE has been proposed by authors of textbook and researchers. Haring et al proposed a core physical examination by doing a survey on what medical students do and what supervisor's physicians are doing themselves [1]. Gowda et al proposed a core physical examination by doing a survey on what medical student should perform on every patient [3]. The aim of this study is to identify which signs are correlated to imaging studies, electrophysiological studies, intraoperative findings and autopsies when available.

Physicians should continue to rely on physical examination as one particularly important diagnostic tool. Another role of physical exam is that it also builds a physician-patient bond and trust [4]. It is important in this context to teach evidence-based maneuvers that will give useful information. To the best of my knowledge such work has not been published.

Material and Methods

To establish a framework of HTTE we compared different models from textbooks like; Bates' Guide to Physical Examination & History Taking, DeGowin's Diagnostic Examination, Hutchison's Clinical Methods, Talley and O'Connor's Clinical Examination to propose a framework. We also compared the core physical examination proposed by Gowda et al [3] and Haring et al [1]. A template for HTTE was created from the afore mentioned models. Then, we looked for evidence in PUBMED. We search studies published in English, from 1980 to 2023 with search terms such as "accuracy of signs", "accuracy of clinical diagnosis", "comparison of ultrasound with physical examination". We included articles with randomized controlled trial.

Results

We were able to establish the bare minimum HTTE content and order. The framework below that can be used for all newly admitted patients: 1) General inspection, 2) head and neck, 3) chest, 4) abdomen and 5) Limbs. This HTTE has 24 maneuvers. General inspection was not included. It is less than the 45 maneuver core physical examination suggested by Gowda et al [3]. Based on evidence it can be used to detect subtle abnormalities and can be complete within 10 minutes.

Discussion

This HTTE has 24 maneuvers. It is less than the 45 maneuver core physical examination suggested by Gowda et al [3]. The limited number of maneuver is consistent with the findings of Haring concerning the discrepancy between what doctors do and what they expect medical students to do [1].

General inspection

Inspection is a continuous process starting from when the patient is seen on the bed or walking in from the door.

Vital signs

Vital signs are assessed by nurses in the ward or in the outpatient clinic. We are suggesting they should be repeated if abnormal.

HEENT

Inspection oral cavity and oropharynx is important. Examination of the ear is not necessary in absence of symptom and signs.

Neck examination

The neck examination evaluates lymph nodes and thyroid gland. The thyroid palpation is accurate to measure the size comparing to the ultrasound [5] and less accurate for nodules assessment [6].

Lung's examination

Lung examination can be limited to inspection, percussion and auscultation in the absence of respiratory symptoms. Lung palpation is useful to diagnose pleural effusion, it is correlated to the presence of pleural effusion [7].

Heart examination

Inspection and auscultation are enough. Palpation of precordium is useful when there is suspicion of heart failure. The apex beat is palpable in supine position in one third of adult and is prevalence is low in heart failure [8].

Abdomen examination

We are suggesting inspection and palpation as routine. Percussion is useful to diagnose ascites when the suspicion is high [9]. Auscultation is done mostly to assess bowel sounds. Bowel sounds auscultation is not correlated to imaging and intraoperative findings in case of bowel obstruction [10-12].

Peripheral vascular examination

We are suggesting inspection to look for varicose veins, leg ulcers, edema and other abnormalities. Palpation of posterior tibial and dorsalis pedis arteries are useful screening tests for peripheral arterial [13]. If they are all normal and femoral bruit is absent the probability of peripheral arterial diseases is low [13]. Carotid pulses and jugular venous pulses have a low sensitivity [14]. They are not suitable to assess all patients irrespective of their complaint.

Neurologic examination

The aim of the screening neurologic examination is detection of subtle abnormal findings: cognitive dysfunction, subtle hemiparesis, peripheral neuropathies. The full neurologic examination seems to be appropriate when the

Frank Z and Maryl N., Arch Clin Med Case Rep 2023
DOI:10.26502/acmcr.96550612

patient has a complaint suggesting a neurologic disorder. Mental status is done during medical interview. A patient narrating with details his or her story has normal memory, attention, orientation.

Cranial nerves: the minimum for cranial nerves examination is extraocular movement, facial muscles, tongue [15].

Motor examination: Three maneuvers are useful to detect subtle hemiparesis: thumb rolling tests, rapid alternating movements of the hands, pronator drift test [16]. We are suggesting thumb rolling test. Deep tendon reflexes are useful to differentiate upper and lower motoneuron weakness. They are useful when there are symptoms and signs of neurological diseases [17]. The bare minimum is ankle reflex. Peripheral neuropathies can be screen by combining ankle reflex and monofilament or vibration testing, they are correlated to electrophysiological studies [18]. Plantar reflex has a low sensitivity to be used as part of screening neurological examination to rule out pyramidal tract dysfunction [19]. We therefore do not recommend plantar for all patient.

Sensory examination: For the screening sensory examination, we are suggesting use of monofilament or vibration testing with 128 Hz tuning fork. They are correlated to electrophysiological studies [18].

Table 1: Head to toe examination.

General inspection	Overall appearance, hands
Vital signs	Blood pressure, pulse, temperature, respiratory rate
Eyes	Inspection of the conjunctiva and sclera
ENT	Inspection of the oral cavity and pharynx
Neck	Palpation of the lymph nodes of the head and neck
Lungs	Inspection of the chest
	Percussion of the lungs field
	Auscultation of the lung fields
Heart	Inspection
	Auscultation of the heart
Abdomen	Inspection of the abdomen
	Light and deep palpation of the abdomen
Extremities	Palpation of the dorsalis pedis artery
	Palpation of the posterior tibial artery
	Palpation of the dorsum of feet and shin for pitting edema
Nervous system	Cranial nerves: eyes movement, facial strength, tongue
	Motor exam: thumb rolling test
	Reflexes: ankle reflex
	Sensory: vibration testing with 128 Hz tuning fork
	Gait: casual and tandem gait

Gait exam: We are suggesting observing patient walking, turning, and performing tandem gait. The examination of breasts, urogenital system is sensitive and usually when they are symptoms. When medical students are able to perform within 15 minutes the HTTE in a calm manner and with good technique, they can learn musculoskeletal examination, breast examination, and urogenital examination. They can also learn hypothesis driven examination.

Conclusions

Teaching medical student, a simple and effective head to toe examination is one of the responses to the declining art of physical examination. It is important to teach overly sensitive or specific maneuver to apply in different setting.

A physical examination with few maneuvers has been proposed. It can be used in all setting, even in low resource setting without compromising the quality of care. We hope it will be used as a steppingstone for more research in the physicians and medical students' population.

Conflicts of Interest

We have no conflicts of interest to disclose.

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