BOOK REVIEW

The neurological examination taught in 1897 compared – from *Hutchison's*

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INTRODUCTION

In contemporary medical practice most diagnoses are based on key features of the patient's history, backed up by laboratory and radiological investigations, while comparatively few diagnoses are made mainly on the basis of the physical examination. This decline in the importance of physical examination has been attributed to the development of modern diagnostic techniques, which now answer the diagnostic questions previously addressed by the physical examination. Arguably, neurology should be the specialty to have benefited most from such technological advances, particularly in imaging, with the development of CT, MR and PET scanning. Despite this, it is still an article of faith by some that the ability to perform a comprehensive neurological examination is vital in the assessment of diseases of the brain and peripheral nervous system – and so it must be done, and taught, properly.

Examination as compared with 2002 *Clinical Methods*

To investigate whether advances in modern diagnostic techniques have or have not rendered some of the neurological examination obsolete, I compared what is regarded as a standard neurological examination in a contemporary textbook with what was described in the first edition of the same textbook published long before the advent of modern diagnostic techniques. In fact, the only modern textbook that has editions published before the introduction of even plain radiography is *Hutchison's Clinical Methods*. Thus, I selected the first edition (*Clinical Methods: a Guide to the Practical Study of Medicine*, Cassell and Company, London, published 1897) and the most up to date edition (*Hutchison's Clinical Methods*, W.B. Saunders, London, published 2002). I then compared the chapters on the neurological examination with respect to length (word count of the sections on the *physical examination* and *investigation techniques*) and also whether any aspects of the physical examination in 1897 were omitted in 2002, and

therefore are presumably obsolete. As controls, I compared the sections on physical examination and investigative techniques from the chapters on respiratory and cardiovascular disorders (I selected these chapters because the 1897 book had no chapters comparable with the 2002 edition chapters on endocrinology, nephrology, ophthalmology, etc.). I could not compare the *history* sections from any of the chapters in either edition because they had a different format.

NEUROLOGY: EXPANSION OF THE CLINICAL EXAMINATION

Between 1897 and 2002 the section on physical examination in the chapter on the nervous system expanded by more than 50% – from 19 110 to 29 632 words. Moreover, several manoeuvres had been added to the neurological examination and no major aspects had been removed. In both editions the structure of the neurological examination was remarkably similar, beginning with higher functions and

cranial nerves and progressing to the motor and sensory systems.

Between 1897 and 2002 the examination of higher functions expanded considerably. In 1897 there was no assessment of apraxia and, obviously, no description of the Mini-Mental State Examination for formal evaluation of cognitive function. In 1897, an examination to distinguish between dysarthria and dysphasia was described. However, dysphasia was described as simply receptive or expressive while in 2002 the examination covered expressive, receptive, conductive and nominal dysphasia.

As expected, examination of the cranial nerves was little different in the 1897 and 2002 editions.

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Indeed, many of the descriptions of examination technique in the 2002 book were almost direct quotes from the 1897 edition. Of note, the labourious 'red glass test' for diplopia (as opposed to the simple cover test) was present in both editions. The major additions to the 2002 edition were the swinging light test for detecting a relative afferent pupillary defect, and the Dix-Hallpike manoeuvre for benign paroxysmal positional vertigo.

The standard examination of the motor system has not changed over more than a century, with both editions describing almost identical manoeuvres to test muscle power and deep tendon reflexes. Obviously, the 1897 edition did not feature the MRC scale, which was devised during World War Two. The assessment of superficial reflexes was similar in both editions, with the table describing how to elicit them being almost identical in both. However, in 2002, Chaddock's, Oppenheim's and Gordon's methods of eliciting an extensor plantar response were described in addition to Babinski's. In the 1897 edition there was no cerebellar examination, 'co-ordination' was assessed by asking the patient to touch one finger to their nose, or thread a needle! The 2002 edition contained a full description of examining for ataxic gait, intention-tremor, heel-shin inco-ordination, etc. Clearly, this reflects the fact that the 1897 edition preceded Babinski's description of dysidiadokinesia and the work of Gordon Holmes.

As expected, the sensory examinations in the 1897 and 2002 editions were similar. However, there was no assessment of agnosia, inattention or cortical sensation in 1897.

RESPIRATORY MEDICINE AND CARDIOLOGY: INVESTIGATIVE TECHNIQUES REPLACE EXAMINATION

Comparing the 1897 and 2002 editions revealed that the sections devoted to physical examination of the respiratory system (10 000 words vs. 5310 words, 47% less) and cardiovascular system (20 330 vs. 6010 words, 70% less) had shrunk considerably. Many of the examination techniques recorded as standard practice in 1897 were not described at all in the 2002 edition. In 1897 'inspection' was afforded much more importance than in 2002. The 1897 edition described an exhaustive system of chest inspection to detect rickets, TB and severe pleural effusions, while the 2002 edition described only kyphoscoliosis and hyperinflation. The method of chest percussion described in 1897 was also significantly more complex than in the 2002 edition. In 1897 chest percussion was said to detect the depth at which a mass lay from the chest wall and define the structure of the mass (e.g. solid, cystic, fluid filled), while in 2002 percussion was merely recorded as being able to detect consolidation/collapse, etc. The most notable change in the cardiovascular chapters was the absence of cardiac percussion from the 2002 edition. In 1897, a comprehensive method of percussion was described to enable detection of aortic aneurysm, ventricular hypertrophy, pericardial effusion and cardiac displacement by intrathoracic masses.

In the 2002 edition, the cardiovascular and respiratory chapters had sections on investigative techniques – of 10 000 words and 3680 words, respectively, – that were not in the 1897 edition. In 2002 there were large sections on investigative techniques such as chest X-ray and echocardiography. As these techniques are used to diagnose intrathoracic disorders that were once detected on physical examination, it seems logical to suggest that the omissions (e.g. of cardiac percussion) reflect the fact that investigative techniques have rendered these examinations obsolete. That the reduction in text devoted to physical examination was paralleled by the introduction of large sections on investigative techniques fits with the contention that investigative techniques have replaced physical examination in these systems.

This is in contrast to the chapter on the nervous system where the 'Electrical examination of muscles and nerves' section (1850 words) in the 1897 edition was almost directly replaced by the neuroimaging (2300 words) section in the 2002 edition.

EXPANSION OF THE NEUROLOGICAL EXAMINATION: EXPLANATIONS AND IMPLICATIONS

Analysis of what was recorded as a comprehensive physical examination of the nervous system in the 1897 and 2002 editions of *Hutchison's Clinical Methods* does not support the notion that investigative techniques have rendered aspects of the examination obsolete – rather the opposite. The length of text devoted to examination of the nervous system expanded between 1897 and 2002, whilst that describing the cardiovascular and respiratory examinations shrank considerably. Moreover, in the 2002 edition, the neurology chapter contained a section on neuroimaging of similar length to the 1897 section on 'Electrical Examination of Muscles and Nerves'. This is in contrast with the expansion in text devoted to investigative techniques in the 2002 chapters on the cardiovascular and respiratory systems. From this juxtaposition, it seems reasonable to conclude that, while investigative techniques have clearly had increasing importance in neurological diagnosis, they do not seem to have rendered obsolete the ability to perform a comprehensive physical examination, indeed the examination seems even more comprehensive than it once was – at least in a textbook, if not in real life.

The reasons for the apparent continuing importance of physical examination in clinical neurology, as compared with other specialities, are a matter of debate. One important factor is the cost and complexity of neuroimaging techniques, which dictates that investigations must be targeted both to the patients most likely to have organic disease and to the level of the nervous system most likely to be affected by any pathology. Clearly, physical examination – along with the history – has a crucial role both in differentiating functional from organic conditions, and in lesion localization. But maybe it does not have to be quite so comprehensive to achieve those objectives.

Examination of the nervous system is complicated to perform and difficult for medical students to learn. If expansion of what is regarded as a comprehensive neurological examination

continues in the future, then teaching examination may become impractical – if it is not already. From my analysis of *Hutchison's Clinical Methods* it seems that much of the expansion of the neurological examination is due to the acceptance of new examination techniques and signs with little critical appraisal of their clinical utility. In future, application of clinical research to select the most useful examination techniques, and so create an 'Evidence Based Neurological Examination', may prevent clinical evaluation of the nervous system becoming too unwieldy for routine use, and certainly for the modern medical student curriculum.

EDITOR'S COMMENT

Well, well one may not like it but one should have guessed it! What does it all mean? Neurologists have made their own speciality even more impenetrable and lengthy than ever before while other specialists have raced ahead in their ability to diagnose? Or is it that we have learned so much more about disorders of the nervous system compared with other systems? Or is it that neurology is just so endlessly fascinating that we allow ourselves to wallow in the intricacies of the examination, and in the delight

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of catching out the non-neurologist? Getting neurological diagnosis across to medical students is hard enough already and the thought of even more verbiage on the neurological examination should envelop us all in gloom. Why does one so often hear that all will be well if the students can *examine* the nervous system when in fact it will only be well when they learn to take a decent history? Best then to strip out the *recherche* of the examination, concentrate on the core bits that are really needed, and make sure just these are taught and done well. For the non-expert it is disheartening when dysphasia has been distinguished from dysarthria and then along comes the neurologist to subdivide the dysphasia – better just to get on with the brain scan, point the imager at the left cerebral hemisphere, find out where the lesion really is, and maybe what it is too!