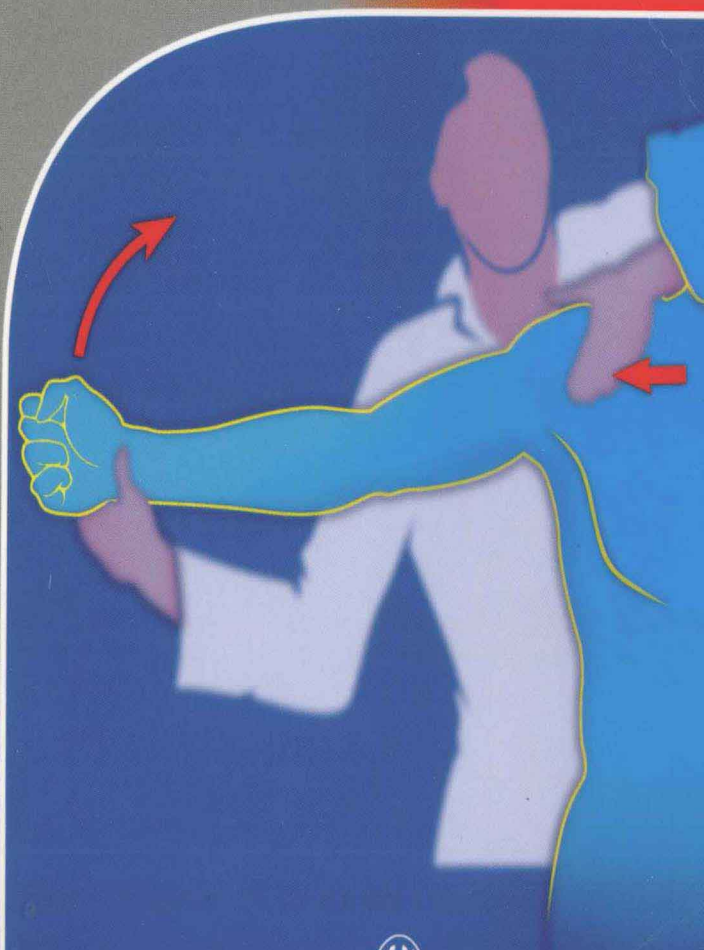


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clinical sciences



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Clinical Tests for the Musculoskeletal System

Examinations—Signs—Phenomena

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Preface to the English Edition

Advancements in orthopedics have occurred at a rapid pace in recent years. Whereas new modalities such as ultrasound, computed tomography, and magnetic resonance imaging are occasionally able to help us make precise orthopedic diagnoses more rapidly, meticulous history taking and thorough clinical examination remain crucial to any treatment.

Every medical specialty has its own particular examination methods. In orthopedics and trauma surgery, these include examination of the joints in combination with precise range of motion testing in the trunk and extremities and evaluation of the musculature. There are many standardized examination methods or tests that can aid in evaluating musculoskeletal dysfunction.

My aim was to apply my knowledge and experience to the task of compiling descriptions of these many tests and grouping them according to the various regions of the body. The book also includes chapters on the evaluation of posture deficiencies, thrombosis, and arterial ischemic disorders. Each test is described step by step, beginning with the patient's initial position. Each of these descriptions also discusses the evaluation of the test and the possible diagnosis that the test may provide. Drawings have been included with each test to illustrate the steps in the examination. Some tests for certain disorders differ only slightly from one another. I have included them nonetheless as my own experience has shown that a diagnosis can often be made only on the basis of several typical tests for a disorder.

The book is intended as a practical guide to facilitate examination of the patient and to help the physician diagnose musculoskeletal disorders and injuries more rapidly. Several editions in various languages have shown that readers are highly interested in a thorough description of standardized examination methods in the form of tests.

The individual chapters have been revised for the English edition and new tests have been included.

Dortmund, May 2004

Klaus Buckup



Bone and Joint Decade 2000–2010

On January 13, 2000, the World Health Organization (WHO) at its headquarters in Geneva declared the first decade of the new millennium “Bone and Joint Decade.”

Gro Harlem Brundtland, physician and former Norwegian Prime Minister and Director-General of the WHO, stated at the opening ceremony that bone and joint disorders had already become the main cause of persistent pain and physical impairments.

Given the current demographic development, the number of people over the age of 50 suffering from such disorders will double in the next 20 years. The WHO initiative aims to increase public awareness of musculoskeletal disorders, improve their prevention and management, and promote opportunities for further education and research in this field.

This book represents my contribution in support of the WHO initiative Bone and Joint Decade 2000–2010.

Klaus Backup

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Spine

Differential diagnosis of back pain is often a daunting task given the wide range of possible causes that must be considered. Terms such as “cervical spine syndrome” or “lumbar spine syndrome” are ambiguous as they identify neither the location nor the nature of the disorder.

Once the history has been taken, any examination of the spine should be preceded by a general physical examination. This required to properly evaluate those changes in the spine that are attributable to causes elsewhere in the body such as in the limbs and muscles. The examination begins with inspection. General body posture is noted, and the position of the shoulders and pelvis (level of the shoulders, comparison of both shoulder blades, level of the iliac crests, lateral pelvic obliquity), vertical alignment of the spine (any deviation from vertical), and the profile of the back (kyphotic or lordotic deformity, or absence of physiologic kyphosis and/or lordosis) are evaluated. Palpation can detect changes in muscle tone such as contractures or myogelosis and can identify tender areas. The active and passive mobility of the spine as a whole and the mobility of specific segments are then evaluated.

In patients presenting with a spine syndrome, the first step is to identify the location and nature of the disorder. Tissue destruction, inflammation, and severe degenerative changes usually involve a characteristic clinical picture with corresponding radiographic and laboratory findings. A number of additional diagnostic modalities can supplement plain-film radiography in cases where further diagnostic studies are indicated to confirm or exclude a tentative diagnosis. The choice of additional imaging modalities depends on the line of inquiry. For example, computed tomography with its higher contrast between bone and soft tissue is more suitable for visualizing changes in bone than is magnetic resonance imaging, whose advantage lies in its high-resolution visualization of soft tissue. Dysfunctional muscular and ligamentous structures render the clinical evaluation of spine syndromes more difficult.

Radiographic and laboratory findings alone are rarely able to provide a conclusive diagnosis in these spinal disorders. This makes manual diagnostic techniques that focus on evaluation of function particularly important. The examiner evaluates changes in the skin (hyperalgesia and characteristics of the paraspinal skin fold, also known as Kibler fold), painful muscle spasms, painfully restricted mobility with loss of

play in the joint, functional impairments with painful abnormal mobility, and radicular pain. The examination evaluates each part of the spine as a whole (cervical, thoracic, and lumbar) and each segment individually.

Because every pair of adjacent vertebrae is connected by many ligaments, only limited motion is possible in any one intervertebral joint. However, the sum of all the movements in the many vertebral articulations results in significant mobility in the spinal column and trunk as a whole. This mobility varies considerably between individuals (Fig. 1). The main motions are flexion and extension in the sagittal plane, lateral bending in the coronal plane, and rotation around the longitudinal axis. The cervical spine exhibits the greatest range of motion. It is both the most highly mobile portion of the spine and the one most susceptible to spinal disorders.

Rotation and lateral bending in the thoracic spine occur primarily in the lower thoracic spine and in the thoracolumbar junction. The lumbar spine with its sagittally aligned facet joints primarily allows flexion and extension (forward and backward bending) and lateral bending. The capacity for rotation is less well developed in this portion of the spine.

Neurologic examination can exclude sensory deficits and palsies of the lower extremities. This includes eliciting intrinsic reflexes to test for nerve stretching signs.

When examining the spine, the physician must consider the possibility that “back pain” may in fact be referred pain caused by pathology in other areas.

■ Range of Motion of the Spine (Neutral-Zero Method)

Fingertips-to-Floor Distance Test in Flexion

Measures the mobility of the entire spine when bending forward (fingertip-to-floor distance in centimeters).

Procedure: The patient is standing. When the patient bends over with the knees fully extended, both hands should come to rest at approximately the same distance from the feet. The distance between the patient's fingers and the floor is measured, or how far the patient's fingers reach may be recorded (knee, mid-tibia, etc.; Fig. 1 h).

Assessment: This mobility test assesses a combined motion involving both the hips and the spine. Good mobility in the hips can compensate for stiffening in the spine. In addition to the distance measured, the

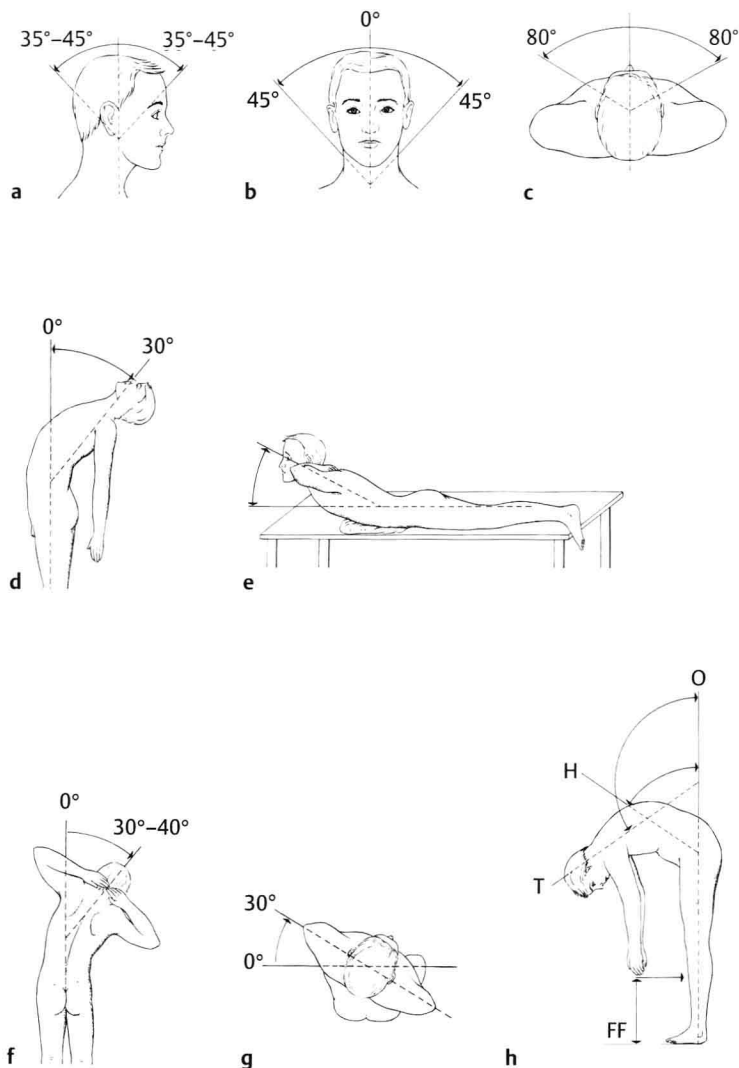


Fig. 1a-h

a Forward and backward bending (flexion and extension). **b** Lateral bending. **c** Rotation in middle position $80^{\circ}/0^{\circ}/80^{\circ}$, rotation in flexion $45^{\circ}/0^{\circ}/45^{\circ}$ (C_0-C_1), rotation in extension $60^{\circ}/0^{\circ}/60^{\circ}$. **d-e** Backward bending (extension) of the spine: standing (**d**) and prone (**e**). **f** Lateral bending of the spine. **g** Rotation of the trunk. **h** Forward bending of entire spine: H flexion in hip, T total excursion, FF distance between fingers and floor